TENANT IMPROVEMENTS FOR: SONNY'S

2201 NE TOWN CENTRE BOULEVARD LEE'S SUMMIT, MISSOURI 64064

PROJECT TEAM:	<u>DR</u>	AWING INDEX:				
CLIENT:	SHEET NO	DESCRIPTION	ISSUE DATE	SHEET NO	DESCRIPTION	ISSUE DATE
SONNY'S"	GENE	EDAI ·		DITIM	1BING:	
	G0.01	TITLE SHEET	8/15/25	P0.01	GENERAL INFORMATION	8/15/25
The CarWash Factory	G0.02	LIFE SAFETY PLAN	8/15/25	P1.01 P2.01	FIRST FLOOR PLUMBING DEMOLITION PLAN FIRST FLOOR PLUMBING PLAN	8/15/25 8/15/25
				P3.01	FIRST FLOOR ENLARGED PLUMBING PLANS	8/15/25
ARCHITECT OF RECORD:				P4.01	PLUMBING SCHEDULES AND DETAILS	8/15/25
				P5.01	PLUMBING SPECIFICATIONS	8/15/25
					T COMBINE OF CONTROL OF THE CONTROL	
	ARCH	HITECTURAL:				
	A0.01	OVERALL DEMOLITION PLAN	8/15/25			
	A1.01	OVERALL FLOOR PLAN	8/15/25			
	A1.11	ENLARGED PLANS	8/15/25			
	A1.21	WALL TYPES AND DETAILS	8/15/25			
	A1.41	ROOM FINISH PLAN	8/15/25			
FOUNDATION	A1.51	PARTIAL REFLECTED CEILING PLAN	8/15/25	MECH	HANICAL:	
ARCHITECTURE, LLC	A6.01	DOOR FRAME SCHEDULE	8/15/25	M0.01	GENERAL INFORMATION	8/15/25
(216) 973-1819				M1.01	FIRST FLOOR MECHANICAL DEMOLITION PLAN	8/15/25
MED ENGINEED.				M2.01	FIRST FLOOR MECHANICAL PLAN	8/15/25
MEP ENGINEER:				M3.01	FIRST FLOOR ENLARGED MECHANICAL PLAN	8/15/25
				M4.01	MECHANICAL SCHEDULES AND DETAILS	8/15/25
nta				M5.01	MECHANICAL OPERIFICATIONS	8/15/25
engineering				M5.02	MECHANICAL SPECIFICATIONS	8/15/25
275 Springside Dr., Suite 300						
Akron, Ohio 44333 Phone: 330-666-3702						
ptaengineering.com						
	ELEC	TRICAL:				
	E0.01	ELECTRICAL DEMOLITION PLAN	8/15/25			
	E1.01	LIGHTING PLAN	8/15/25			
	E1.02	RECEPTICAL PLAN	8/15/25			
	E1.03	EQUIPMENT WIRING PLAN	8/15/25			
	E1.04	SYSTEMS WIRING PLAN	8/15/25			
	E2.01	ELECTRICAL SCHEDULES	8/15/25			
	E3.01	ELECTRICAL SPECIFICATIONS	8/15/25			
			1		į	

POUNDS PER CUBIC FOOT

PEMB PRE-ENGINEERED METAL BLDG.

PLAM PLASTIC LAMINATE

PLYWD PLYWOOD

POL POLISHED

PREFIN PREFINISHED PREFAB PREFABRICATED

PROJ PROJECTION

PTD PAINTED

PTN PARTITION

QT QUARRY TILE

RISER

RETURN AIR

ROOF DRAIN

RECEPTACLE

REFRIGERATOR

REINF REINFORCEMENT (REINFORCING)

REVISED (REVISION)

SAC SUSP. ACOUST. CEILING SYSTEM

ROUGH OPENING

SMOKE DETECTOR

SECTION

SHEET

SIM SIMILAR

REGISTER

ROOM

QTY QUANTITY

RAD RADIUS

REQD REQUIRED

RES RESILIENT

RVS REVERSE

POLYISO POLYISOCYANURATE

PRD PRIMARY ROOF DRAIN

POUNDS PER SQUARE INCH

POINT OR POCELAIN TILE

PTWD PRESSURE TREATED WOOD

QRS QUICK SERVE RESTAURANT

PVC POLYVINYLCHLORIDE

INCL INCLUDE(S)

INSUL INSULATION

LAM LAMINATE(D)

LVR LOUVER

MAT MATERIAL

MECH MECHANICAL

MEMB MEMBRANE

MID MIDDLE

MIN MINIMUM

MTD MOUNTED

N/A NOT APPLICABLE

NIC NOT IN CONTRACT

MTL METAL

MULL MULLION

NO NUMBER

NTS NOT TO SCALE

ON CENTER

OHD OVERHEAD DOOR

O/O OUT TO OUT

OPP OPPOSITE

OPT OPTIONAL

OPG OPENING

OUTSIDE DIAMETER

OSHA OCCUPATIONAL SAFETY AND

HEALTH ADMINISTRATION

NOM NOMINAL

MFR MANUFACTURER

MANHOLE

MISC MISCELLANEOUS

MO MASONRY OPENING

LED LIGHT EMITTING DIODE

SPEC SPECIFICATIONS

SPKR SPEAKER

SPKLR SPRINKLER

SQ IN SQUARE INCH

STD STANDARD

STOR STORAGE

SS STAINLESS STEEL/SLOP SINK

STRUC STRUCTURE (STRUCTURAL)

T&G TONGUE AND GROOVE

TELEPHONE

TEMP TEMPORARY

TEMP'D TEMPERED

TME TO MATCH EXISTING

T/STEEL TOP OF STEEL

T/MASY TOP OF MASONRY

MEMBRANE)

UNO UNLESS NOTED OTHERWISE

VCT VINYL COMPOSITE TILE

VWC VINYL WALLCOVERING

T/JOIST TOP OF JOIST

UC UNDERCUT

UG UNDERGROUND

UNFIN UNFINISHED

UNLTD UNLIMITED

VERT VERTICAL

VEST VESTIBULE

VIF VERIFY IN FIELD

T/DECK TOP OF DECK

T/CONC TOP OF CONCRETE (TOP OF CURB)

TPO THERMOPLASTIC POLYOLEFIN (ROOF

TRENCH DRAIN

W/O WITHOUT

WD WOOD

WIN WINDOW

W/W WALL TO WALL

WC WATER CLOSET

WH WATER HEATER

WWF WELDED WIRE FABRIC

XPS EXTRUDED POLYSTYRENE (FOAM)

ABBREVIATION LEGEND

ACOUSTICAL CEILING TILE

ABOVE FINISH FLOOR

ADJACENT

ALTERNATE

ARCHITECT(URAL)

CENTER TO CENTER

CORNER GUARD

CONTROL JOINT

CONCRETE MASONRY UNIT

CASED OPENING/CLEAN OUT

CEILING CLEAR COUNTER

CONCRETE

CONSTRUCTION

CONTINUOUS

COORDINATE

CORRIDOR CARPET

CERAMIC TILE

CENTER

DEPTH DOUBLE

DEGREES

DEMOLITION

DIMENSION

DOWN SPOUT

DOWN DOOR

DETAIL

DRAWING

DRINKING FOUNTAIN

AUTOMATIC

ALUM ALUMINUM
ANOD ANODIZED
APPROX APPROXIMATE
ARCH ARCHITECT(URA

AUTO

CJ
CLG
CLR
CNTR
CMU
CO
COL
CONC
CONST
CONST
COORD
CORR
CPT
CT
CTR

ALUMINUM COMPOSITE MATERIAL EPDM ETHYLENE PROPYLENE DIENE

EXPANDED POLYSTYRENE (FOAM)

EXISTING TO REMAIN

FLOOR DRAIN

FOUNDATION

FIN FINISH

FLR OR FL FLOOR

FLUOR FLUORESCENT

FIRE EXTINGUISHER FIRE EXTINGUISHER CABINET

FPWH FROST-PROOF WATER HYDRANT

FRP FIBERGLASS REINFORCED PANELS

FRT FIRE-RETARDANT TREATED

FRTWD FIRE-RETARDANT TREATED

FIRE VALVE CABINET

GENERAL CONTRACTOR

FWC FABRIC WALLCOVERING

GALVANIZED

GAUGE

GYP BD GYPSUM BOARD

HOLLOW CORE

HOLLOW METAL

HIGH POINT

HOUR

HTG HEATING

HW HOT WATER

HEIGHT

HEATER

HVAC HEATING, VENTILATION AIR

HPDL HIGH PRESSURE DECORATIVE

HB HOSE BIBB

HDWR HARDWARE

HORIZ HORIZONTAL

WOOD

FTG FOOTING

FURR FURRING

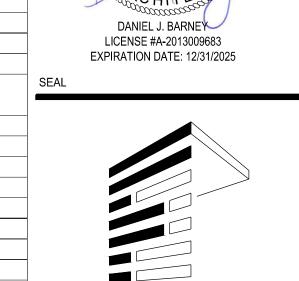
ELECTRIC WATER COOLER

UILDING CO ROJECT CF	RITERIA:										
OCCUPANCY CLASS	SIFICATION: B_BUSINESS	2,423 S.F.	CHAPTER 6			ONSTRUCTION	1			TVDE 3	
	H-3 HIGH HAZARD S-1 MODERATE HAZARD STO	17,165 S.F. ORAGE 4,914 S.F.	T 601	BUILDI	NG ELEMEN	IT			-	TYPE 2 B	
TENANT AREA (TOTAL	AL):	24,502 S.F.			RY STRUCT	URAL FRAME				0	
TYPE OF CONSTRUCT	CTÍON: VB 🔼	•			EXTERIOR INTERIOR					0	
SPRINKLED: FIRE ALARM:	YES (ESFR) YES					LS AND PARTIT	IONS EXTERIOR		SI	EE T 602	
TINE ALAKWI.	TEO					LS AND PARTIT		0		0	
							ONDARY MEMBER NDARY MEMBERS			0	
			CHAPTER 7				CONSTRUCTION		I		
PROJECT DESCRIPT	TION:		3.77.			1	LIES, RATINGS AND MARKINGS	8			
INTERIOR	R TENANT BUILD-OUT OF AN EXISTING BUILD		TYPE OF ASSEMBLY	REQUIRED WALL ASSEMBLY RATING	FIRE DOOR AND FIRE SHUTTER ASSEMBLY	DOOR VISION PANEL SIZE ^D	FIRE-RATED GLAZING MARKING DOOR VISION PANEL ^{C, S}	MINIMUM SIDELIGHT/ TRANSOM ASSEMBLY RATING (hours)	FIRE-RATED OF MARKING SIDELIGHT/TRAN	NG SOM PANEL	
	EW OFFICE SPACE . NEW WAREHOUSE AREA ED RACKING LOCATIONS AND A LIQUID STO	·		(hours)	RATING (hours)	See Note b	D-H-W-240	Fire Fire protection resistance	Fire protection Not Permitted	Fire resistance W-240	
			Fire walls and fire barriers having a required fire-	3	За	See Note b	D-H-W-180	Not 3 Permitted	Not Permitted	VV-180	
GOVERNING CODES:	S:		resistance rating greater than 1 hour	2	11/2	100 sq. ln.	≤100 sq. in. = D-H-90 >100 sq. In.=D-H-W-90 ≤100 sq. in. = D-H-90	Not 2 Permitted 2	Not Permitted	W-120	
	G CODE: KANSAS CITY BUILDING CODE 2018	,	Enclosures for shafts, interior	11/2	11/2	100 sq. in.	>100 sq. in.= D-H-W-90 ≤100 sq. in. = D-H-90	Permitted 11/2	Not Permitted	W-90	
PLUMBING	IG CODE: KANSAS CITY PLUMBING CODE 20		exit stainways and interior exit ramps.	2	11/2	100 sq. in. ^a	> 100 sq. in.= D-H-T-VV-90	Not 2 Permitted	Not Permitted	W-120	
	ABILITY CODE: 2010 ADA STANDARDS CAL CODE: KANSAS CITY ELECTRICAL CODI	E 2017	Horizontal exits	4	3	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in.= D-H-W-240	Not 4 Permitted	Not Permitted	W-240	
ENERGY	CODE: KANSAS CITY ENERGY CODE 2021		in fire walls ^d	3	3ª	100 sq. in.	≤100 sq. in. = D-H-180 > 100 sq. in. = D-H-W-180	Not 3 Permitted	Not Permitted	W-180	
CHAPTER 3	USE AND OCCUPANCY CLASSI	IFICATION	Fire barriers having a required fire-resistance reting of 1 hour.								
304.1	BUSINESS GROUP B		Enclosures for shafts, exit access stainways, exit	1	1	100 sq. in.	≤100 sq. in. = D-H-60>100 sq.	Not 1	Not Permitted	W-80	
307.5 311.2	HIGH-HAZARD GROUP H-3 MODERATE-HAZARD STORAGE GRO		access ramps, Interior exit stairways and		******		In.=D-H-T-W-60	Permitted			
HAPTER 5	GENERAL BUILDING HEIGHTS A		interior exit ramps; and exit passageway walls								
BUILDING DATA	STORIES = 1	0.100.07	CHAPTER 8	INT	ERIOR FIN	IISHES					
	GROSS AREA B GROSS AREA H-3	= 2,423 SF = 17,165 SF	T 803.1.1		NKLERED	EXIT ENCLO			OOMS AND		
	GROSS AREA S-1 TOTAL GROSS AREA (TENANT)	= 4,914 SF = 24,502 SF		LIGE	GROUP B	AND PASSAGE			NCLOSED SI C	PACES	
	TOTAL BUILDING AREA	= 250,440 SF			GROUP B	C		C C	C		
507.1		OCCUPANCIES AND CONFIGURATIONS	-		GROUP H	В		В	C		
007.1		ROUGH 507.13 SHALL NOT BE LIMITED.					'				
		ES SHALL BE PERMITTED IN UNLIMITED AREA				,	MOKE-DEVELOPED SMOKE-DEVELOPE				
	BLIII DINGS IN ACCORDANCE WITH	H THE PROVISIONS OF SECTION 508.2.				,	SMOKE-DEVELOPE				
	BOILDINGS IN AGGORDANGE WITT					0					
507.2	WHERE SECTION 507.2 THROUGH	I 507.13 REQUIRE BUILDINGS TO BE YEVELOW PUBLIC WAYS AND YARDS THESE OPEN	CHAPTER 9				/S - FULLY S	PRINKLERE)		
507.2	WHERE SECTION 507.2 THROUGH	PUBLIC WAYS AND YARDS THESE OPEN	CHAPTER 9	FIRE	E PROTEC	CTION SYSTEN	D PRODUCT DATA	FOR ALL COM	PONENTS (OF THE SPRINKLER SYST	
507.2	WHERE SECTION 507.2 THROUGH SURROUNDED AND ADJOINED BY SPACES SHALL BE DETERMINED A 1. YARDS SHALL BE MEASUREI	PUBLIC WAYS AND YARDS THESE OPEN AS FOLLOWS: TO FROM BUILDING PERIMETER IN ALL	903	FIRE DRAW SHALL SPRIN	E PROTEC INGS, SPEC BE PREPAI	CTION SYSTEN CIFICATIONS ANI RED BY AN REG EM SHALL BE SI	D PRODUCT DATA ISTERED DESIGN JBMITTED FOR RE	FOR ALL COM PROFESSIONA VIEW AND API	PONENTS (AL OR AN CE PROVAL BE	ERTIFIED SPRINKLER SY FORE ANY WORK ON TH	STEM DESIGNER . THE AT SYSTEM IS
507.2	WHERE SECTION 507.2 THROUGH SURROUNDED AND ADJOINED BY SPACES SHALL BE DETERMINED A 1. YARDS SHALL BE MEASURED DIRECTIONS TO THE CLOSES FACE OF AN OPPOSING BUIL	' PUBLIC WAYS AND YARDS THESE OPEN AS FOLLOWS:	903	FIRE DRAW SHALL SPRIN STAR DESIG	PROTECTION INGS, SPECTION BE PREPARENT IKLER SYSTEM TED. THIS DISTORTED.	TION SYSTEM EFICATIONS ANI RED BY AN REG EM SHALL BE SI EFERRED SUBM	D PRODUCT DATA ISTERED DESIGN JBMITTED FOR RE IITTAL (UNDER SEI	FOR ALL COM PROFESSIONA VIEW AND API PARATE PERM	PONENTS (AL OR AN CE PROVAL BE IIT) SHALL (ERTIFIED SPRINKLER SY	STEM DESIGNER . THE AT SYSTEM IS SIGNATURE OF THE
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	WHERE SECTION 507.2 THROUGH SURROUNDED AND ADJOINED BY SPACES SHALL BE DETERMINED A 1. YARDS SHALL BE MEASURED DIRECTIONS TO THE CLOSES FACE OF AN OPPOSING BUILD APPLICABLE. 2. WHERE THE BUILDING FROM THE PUBLIC WAY SHALL BE OF A SPRINKLERED, THE AREA OF B,E,F STORY ABOVE GRADE PLANE OF A GROUP A-4 BUILDING NO MORE THAN CONSTRUCTION TYPE V CO THE BUILDING IS PROVIDED WITH THROUGHOUT IN ACCORDANCE V AND ADJOINED BY PUBLIC WAYS OF	PUBLIC WAYS AND YARDS THESE OPEN AS FOLLOWS: D FROM BUILDING PERIMETER IN ALL IST INTERIOR LOT LINES OR TO THE EXTERIOR LOING LOCATED ON THE SAME LOT AS NTS ON A PUBLIC WAY, THE ENTIRE WIDTH OF USED. JEAN OR S BUILDING NO MORE THAN ONE ANY CONSTRUCTION TYPE, OR THE AREA OF THAN ON STORY ABOVE GRADE OF OTHER DINSTRUCTION, SHALL NOT BE LIMITED WHERE HAN AUTOMATIC SPRINKLER SYSTEM WITH SECTION 903.3.1.1 AND IS SURROUNDED OR YARDS NOT LESS THAN 60 FEET IN WIDTH.	903 T 906.3(1)	FIRE E	E PROTECTION INGS, SPECTON BE PREPAIN IKLER SYSTITED. THIS DISTRIBLED. EXTINGUISH IUM-RATED STATES MUM-RATED STATES MUM FLOOR	ETION SYSTEM EIFICATIONS ANI RED BY AN REG EM SHALL BE SI EFERRED SUBM SIONAL OR THE ER FOR CLASS	D PRODUCT DATA ISTERED DESIGN JBMITTED FOR RE IITTAL (UNDER SEI CERTIFICATION NU A FIRE HAZARDS ISHER	FOR ALL COM PROFESSIONA EVIEW AND API PARATE PERM UMBER AND SI LIGHT (LO' OCCUPAN	PONENTS (AL OR AN CE PROVAL BE IIT) SHALL (GNATURE (W) HAZARD CY	ERTIFIED SPRINKLER SY FORE ANY WORK ON TH CONTAIN THE SEAL AND OF THE CERTIFIED SPRII ORDINARY (MODERATI HAZARD OCCUPANCY	STEM DESIGNER . THE AT SYSTEM IS SIGNATURE OF THE IKLER SYSTEM E) EXTRA (HIGH) HAZARD OCCUPAN
507.4	WHERE SECTION 507.2 THROUGH SURROUNDED AND ADJOINED BY SPACES SHALL BE DETERMINED A 1. YARDS SHALL BE MEASURED DIRECTIONS TO THE CLOSES FACE OF AN OPPOSING BUILD APPLICABLE. 2. WHERE THE BUILDING FROM THE PUBLIC WAY SHALL BE OF A GROUP A-4 BUILDING NO MORE THAN CONSTRUCTION TYPE V CO THE BUILDING IS PROVIDED WITH THROUGHOUT IN ACCORDANCE V AND ADJOINED BY PUBLIC WAYS OF A GROUP H-2, H-3 AND H-4 OCCUPAL AREA BUILDINGS CONTAINING GROUTH SECTIONS 507.4 AND 507.5 A	PUBLIC WAYS AND YARDS THESE OPEN AS FOLLOWS: ED FROM BUILDING PERIMETER IN ALL IST INTERIOR LOT LINES OR TO THE EXTERIOR LDING LOCATED ON THE SAME LOT AS INTS ON A PUBLIC WAY, THE ENTIRE WIDTH OF USED. F,M OR S BUILDING NO MORE THAN ONE ANY CONSTRUCTION TYPE, OR THE AREA OF THAN ON STORY ABOVE GRADE OF OTHER DISTRUCTION, SHALL NOT BE LIMITED WHERE AN AUTOMATIC SPRINKLER SYSTEM WITH SECTION 903.3.1.1 AND IS SURROUNDED OR YARDS NOT LESS THAN 60 FEET IN WIDTH.	903 T 906.3(1)	FIRE E MINIM MAXII	E PROTEC VINGS, SPEC BE PREPAI IKLER SYST TED. THIS DI SN PROFESS SNER. EXTINGUISH MUM-RATED S MUM FLOOR MUM FLOOR	ETION SYSTEN CIFICATIONS ANI RED BY AN REG EM SHALL BE SI EFERRED SUBN SIONAL OR THE ER FOR CLASS SINGLE EXTINGU AREA PER UNIT AREA F OR EXTI	D PRODUCT DATA ISTERED DESIGN JBMITTED FOR RE IITTAL (UNDER SEI CERTIFICATION NU A FIRE HAZARDS ISHER	FOR ALL COM PROFESSIONA EVIEW AND API PARATE PERM UMBER AND SI LIGHT (LO' OCCUPAN 2 3 1	PONENTS (AL OR AN CE PROVAL BE IIT) SHALL (IGNATURE (W) HAZARD CY -A 1000 SF	ERTIFIED SPRINKLER SY FORE ANY WORK ON TH CONTAIN THE SEAL AND OF THE CERTIFIED SPRII ORDINARY (MODERATI HAZARD OCCUPANCY 2-A 1500 SF	STEM DESIGNER . THE AT SYSTEM IS SIGNATURE OF THE IKLER SYSTEM E) EXTRA (HIGH) HAZARD OCCUPAN 4-A 1000 SF
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507.4	WHERE SECTION 507.2 THROUGH SURROUNDED AND ADJOINED BY SPACES SHALL BE DETERMINED A 1. YARDS SHALL BE MEASURED DIRECTIONS TO THE CLOSES FACE OF AN OPPOSING BUILD APPLICABLE. 2. WHERE THE BUILDING FROM THE PUBLIC WAY SHALL BE OF A GROUP A-4 BUILDING NO MORE THAN CONSTRUCTION TYPE V COUTHE BUILDING IS PROVIDED WITH THROUGHOUT IN ACCORDANCE V AND ADJOINED BY PUBLIC WAYS OF A GROUP H-2, H-3 AND H-4 OCCUPAN AREA BUILDINGS CONTAINING GR WITH SECTIONS 507.4 AND 507.5 A THROUGH 507.8.4. THE AGGREGATE FLOOR AREA OF UNLIMITED AREA BUILDING SHALL THE BUILDING OR THE AREA LIMIT	PUBLIC WAYS AND YARDS THESE OPEN AS FOLLOWS: D FROM BUILDING PERIMETER IN ALL IST INTERIOR LOT LINES OR TO THE EXTERIOR LDING LOCATED ON THE SAME LOT AS NTS ON A PUBLIC WAY, THE ENTIRE WIDTH OF USED. F,M OR S BUILDING NO MORE THAN ONE ANY CONSTRUCTION TYPE, OR THE AREA OF THAN ON STORY ABOVE GRADE OF OTHER DISTRUCTION, SHALL NOT BE LIMITED WHERE AN AUTOMATIC SPRINKLER SYSTEM WITH SECTION 903.3.1.1 AND IS SURROUNDED OR YARDS NOT LESS THAN 60 FEET IN WIDTH. INCIES SHALL BE PERMITTED IN UNLIMITED ROUP F OR S OCCUPANCIES IN ACCORDANCE AND THE PROVISIONS OF SECTIONS 507.8.1 F GROUP H OCCUPANCIES LOCATED IN AN L NOT EXCEED 10 PERCENT OF THE AREA OF TATIONS FOR THE GROUP H OCCUPANCIES AS DON THE PERIMETER OF EACH GROUP H	903 T 906.3(1)	FIRE E MINIM MAXII FIRE E TYPE	E PROTECTION OF THE PROTECTION OF THE PROPESSION OF THE PROFESSION	ETION SYSTEN CIFICATIONS ANI RED BY AN REG EM SHALL BE SI EFERRED SUBM SIONAL OR THE ER FOR CLASS SINGLE EXTINGU AREA PER UNIT AREA F OR EXTII CE OF TRAVEL T	D PRODUCT DATA ISTERED DESIGN I JBMITTED FOR RE IITTAL (UNDER SEI CERTIFICATION NU A FIRE HAZARDS ISHER OF A NGUISHER O EXTINGUISHER BASIC MININ EXTINGUISH 5-B	FOR ALL COM PROFESSIONA VIEW AND API PARATE PERM JMBER AND SI LIGHT (LO' OCCUPAN 3 1 7 STIBLE LIQUIDS	PONENTS (AL OR AN CE PROVAL BE IIT) SHALL (IGNATURE (IC)	ORDINARY (MODERATI HAZARD OCCUPANCY 2-A 1500 SF 11,250 SF 75' TH LESS THAN OR EQUAMAX TRAVEL OF DISTANCE TO EXTINGUISHERS (FT)	EXTRA (HIGH) HAZARD OCCUPANI 4-A 1000 SF 11,250 SF 75'
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CHAPTER 29 PLUMBING T 2902.1 OCCUPANT LOAD MEN OCCUPANTS OCC / FIX OCC / FIX # FIX 1 PER 100 1 PER 100 1 PER 25 FOR THE 1ST 50 AND 1 PER 50 1 PER 40 FOR THE 1ST 40 AND 1 PER 80 | .20 FOR THE REMAINDER EXCEEDING 80 FOR THE REMAINDER EXCEEDING 50 TOTAL REQUIRED 1 0 OCC / FIX OCC / FIX 1 PER 100 1 PER 25 FOR THE 1ST 50 AND 1 PER 50 1 PER 40 FOR THE 1ST 40 AND 1 PER 80 FOR THE REMAINDER EXCEEDING 50 FOR THE REMAINDER EXCEEDING 80 TOTAL REQUIRED

URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50% OF THE REQUIRED WATER CLOSETS.

TOTAL PROVIDED



740 MARKS ROAD - SUITE A, VALLEY CITY, OHIO 44208

DANIEL J. BARNEY

A-2013009683

- THE CONTRACT DOCUMENTS ARE PREPARED FOR THE CONTRACTOR TO BECOME FAMILIAR WITH THE SCOPE OF WORK AND PROPOSED DESIGN CONCEPT.
- DO NOT SCALE THE CONTRACT DOCUMENTS. DIMENSIONS AS INDICATED SHALL GOVERN.
- CONTRACTORS SHALL WARRANT THEIR RESPECTIVE CONSTRUCTION AND WORK TO BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS IF ALL LOCAL, STATE, AND FEDERAL LAWS, AUTHORITIES HAVING JURISDICTION, AND MANUFACTURER'S INSTALLATION AND WARRANTY REQUIREMENTS.
- CONTRACTORS SHALL PROVIDE ALL REQUIRED LABOR AND MATERIALS TO ACHIEVE INDUSTRY STANDARD OF MEANS AND METHODS TO ACHIEVE THE DESIGN INTENT OF THE CONTRACT DOCUMENTS REGARDLESS WHETHER OR NOT DOCUMENTED HEREIN; CONSIDERATIONS FOR ADDITIONAL LABOR OR MATERIAL COSTS ON THE BASIS OF OMISSIONS
- INTERPRETATIONS, CLARIFICATIONS, CHANGES, DELETIONS, AND RELATED MODIFICATIONS TO THE CONTRACT DOCUMENTS SHALL BE SOLELY BY THE ARCHITECT EITHER BY ISSUANCE OF A CONSTRUCTION CHANGE DIRECTIVE OR ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR(S) TO VERIFY ALL FIELD CONDITIONS PRIOR TO SUBMITTING PROJECT BIDS, ORDERING MATERIALS, GENERATING SHOP DRAWINGS AND SUBMITTALS, AND START OF WORK, THE ARCHITECT SHALL NOT BE HELD LIABLE FOR UN-VERIFIED FIELD CONDITIONS.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES, DIFFERENCES, OR ABNORMALITIES WITH THE FIELD CONDITIONS AGAINST THOSE AS DOCUMENTED IN THE CONSTRUCTION DOCUMENTS IN A TIMELY FASHION. THE CONTRACTOR SHALL BE HELD LIABLE FOR FAILURE TO REPORT ITEMS TO THE ARCHITECT AND RESPONSIBLE FOR CONSTRUCTION COSTS AND APPLICABLE FEES TO REMEDY CONFLICTS.
- NO SUBSTITUTIONS, CHANGES, OR OMISSIONS TO THE CONTRACT DOCUMENTS ARE PERMITTED. CONTRACTOR MAY REQUEST SUBSTITUTIONS, CHANGES, AND/OR OMISSIONS IN
- WRITING TO THE ARCHITECT, ALLOW MIN 2 WEEKS FOR REVIEW/APPROVAL. CLARIFICATIONS TO THE DOCUMENTS SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT FOR REVIEW AND RESPONSE.
- THE CONTRACTOR IS RESPONSIBLE FOR THE REVIEW AND COORDINATION OF WORK AS ENTAILED WITHIN THE CONTRACT DOCUMENTS, INCLUDING THOSE OF THE ARCHITECT'S CONSULTANTS. COORDINATION OF RELATED TRADE WORK SHALL INCLUDE BUT NOT BE LIMITED TO: SEQUENCING, PHASING, FIELD COORDINATION, CUTS AND OPENINGS,
- THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES PRIOR TO ORDERING MATERIALS. THE ARCHITECT SHALL NOT BE HELD LIABLE FOR QUANTITIES AS NOTED ON

	ISSUED	8/15/25
52	ADDENDUM A	9/10/25
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DRAWN BY: RP

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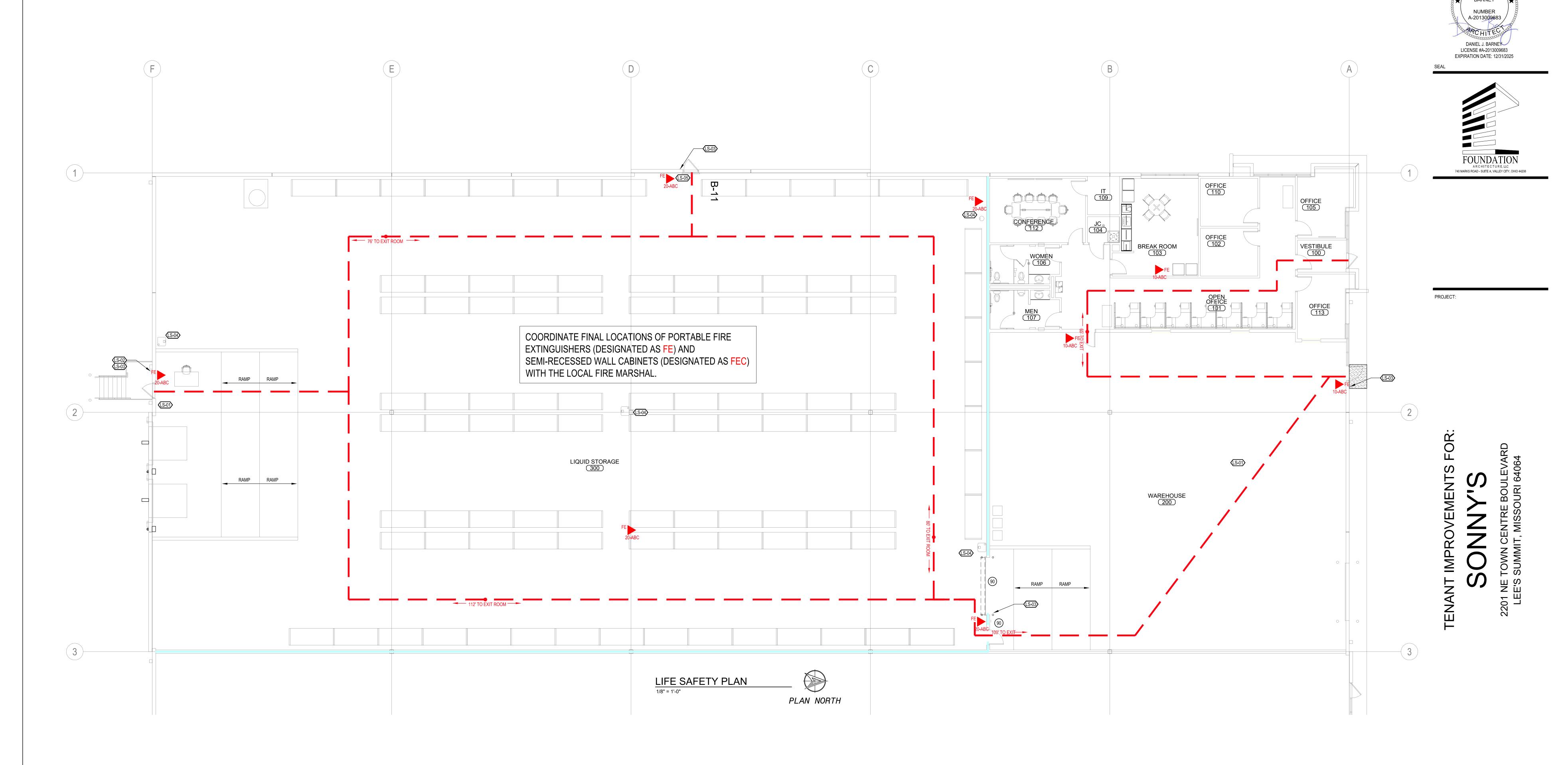
TITLE SHEET

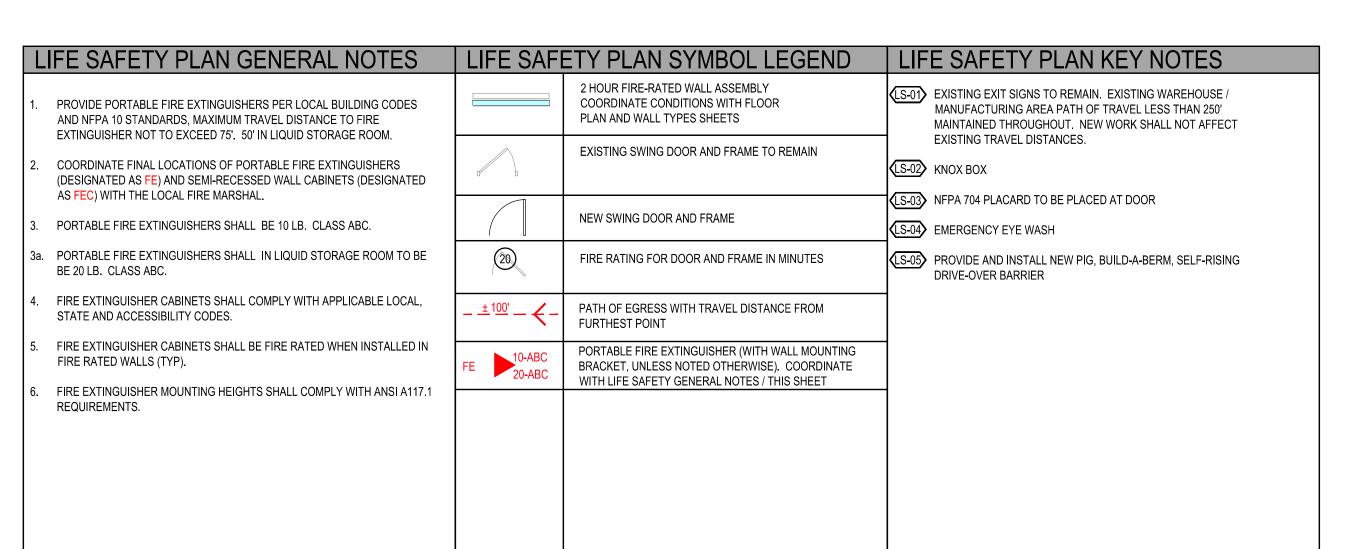
SHOP DRAWING / PRODUCT SUBMITTAL REQUIREMENTS IF THE PROPOSED SUBSTITUTION IS ACCEPTED. SHOP DRAWING / PRODUCT SUBMITTAL REQUIREMENTS: 3.6. CERTIFICATION BY THE CONTRACTOR THAT THE PROPOSED SUBSTITUTION IS IN COMPLIANCE WITH THE CONTRACT ALLOW 2 WEEKS FOR SPECIFIED PRODUCT SUBMITTAL REVIEWS AND COMMENT. DOCUMENTS AND APPLICABLE REGULATORY REQUIREMENTS. 3.7. LIST OF OTHER WORK, IF ANY, WHICH MAY BE AFFECTED BY THE SUBSTITUTION.

- ALLOW AN ADDITIONAL 1 WEEK FOR REVIEW OF PRODUCT SUBSTITUTIONS TO ACCOMMODATE ANY THIRD PARTY REVIEW.
- A PRODUCT SUBMITTAL FOR A DIFFERENT MANUFACTURER AND / OR IDENTIFICATION NUMBER THAN AS SPECIFIED WITHIN THE DOCUMENTS (THAT HAVE NOT BEEN PREVIOUSLY APPROVED, IN WRITING, BY THE ARCHITECT OF RECORD) SHALL BE CONSIDERED A PRODUCT SUBSTITUTION BY MAKING A REQUEST FOR SUBSTITUTION, THE CONTRACTOR: REPRESENTS THAT HE HAS PERSONALLY INVESTIGATED THE PROPOSED SUBSTITUTED PRODUCT AND HAS DETERMINED IT IS FOUAL OR SUPERIOR IN ALL RESPECTS TO THE SPECIFIED PRODUCT
- CERTIFIES THAT THE COST DATA PRESENTED IS COMPLETE AND INCLUDES ALL RELATED COSTS UNDER THE CONTRACT. WAIVES ALL CLAIMS FOR ADDITIONAL COSTS OR SCHEDULE IMPACT RELATED TO THE SUBSTITUTION WHICH SUBSEQUENTLY
- WILL COORDINATE THE INSTALLATION OF THE SUBSTITUTE, MAKING SURE CHANGES THAT MAY BE REQUIRED FOR THE WORK ARE COMPLETE IN ALL RESPECTS REPRESENTS AND CERTIFIES THAT THE PROPOSED SUBSTITUTE COMPLIES WITH ALL APPLICABLE REGULATORY
- REQUIREMENTS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR SECURING REGULATORY APPROVALS FOR SUBSTITUTIONS. CONTRACTOR SHALL SUBMIT COMPARATIVE INFORMATION FOR ALL PRODUCT SUBSTITUTIONS INCLUDING: REASON FOR SUBSTITUTION (IE AVAILABILITY, COST SAVINGS, DELIVERY LEAD TIME, ETC.) COMPLETE TECHNICAL DATA OF ALL CHARACTERISTICS OF THE ORIGINALLY SPECIFIED ITEM, INCLUDING DRAWINGS,
- REFERENCE STANDARDS, PERFORMANCE SPECIFICATION, COST DATA, SAMPLES, AND TEST REPORTS OF THE PRODUCT PROPOSED FOR SUBSTITUTION. SUBMIT ADDITIONAL INFORMATION IF REQUESTED BY THE ARCHITECT / ENGINEER. ANNOTATE THE SPECIFIC SALIENT CHARACTERISTICS WHICH ARE BEING COMPARED TO THOSE OF THE ORIGINALLY SPECIFIED ITEM. THE MERE SUBMISSION OF CATALOG CUTS AND/OR OTHER DATA WITHOUT THE ANNOTATION IS NOT ACCEPTABLE. SEE THE FOLLOWING PARAGRAPH WHICH REQUIRES LINE BY LINE COMPARISON.
- DATA SIMILAR TO THAT SPECIFIED FOR THE ITEM FOR WHICH THE SUBSTITUTION IS PROPOSED. INCLUDE A LINE-BY-LINE COMPARISON OF CHARACTERISTICS BETWEEN SPECIFIED ITEM AND PROPOSED SUBSTITUTE DOCUMENTING EQUAL STATUS. HIGHLIGHT BY UNDERLINING OR OTHER MEANS, CHARACTERISTICS THAT ARE DIFFERENT FROM THOSE OF THE SPECIFIED ITEM.
- EQUIVALENCY WILL BE BASED ON SALIENT CHARACTERISTICS AS DETERMINED BY THE ARCHITECT / ENGINEER. EFFECT ON THE PROGRESS SCHEDULE. 3.5. COMPLETE BREAKDOWN OF COSTS INDICATING THE COST AMOUNT TO BE EQUAL TO OR DEDUCTED FROM THE CONTRACT SUM
- 3.9. SAMPLES, IF REQUESTED, OF BOTH THE ORIGINALLY SPECIFIED PRODUCT AND THE PROPOSED SUBSTITUTE PRODUCT. 3.10. SAMPLE OF STANDARD FORM OF GUARANTEE OR WARRANTY OFFERED BY THE MANUFACTURER FOR THE SUBSTITUTE 4. PHYSICAL SUBMITTALS (IE. PRINTED SHOP DRAWINGS, PRODUCT SAMPLES, ETC) SHALL INCLUDE AT LEAST ONE COPY / SAMPLE

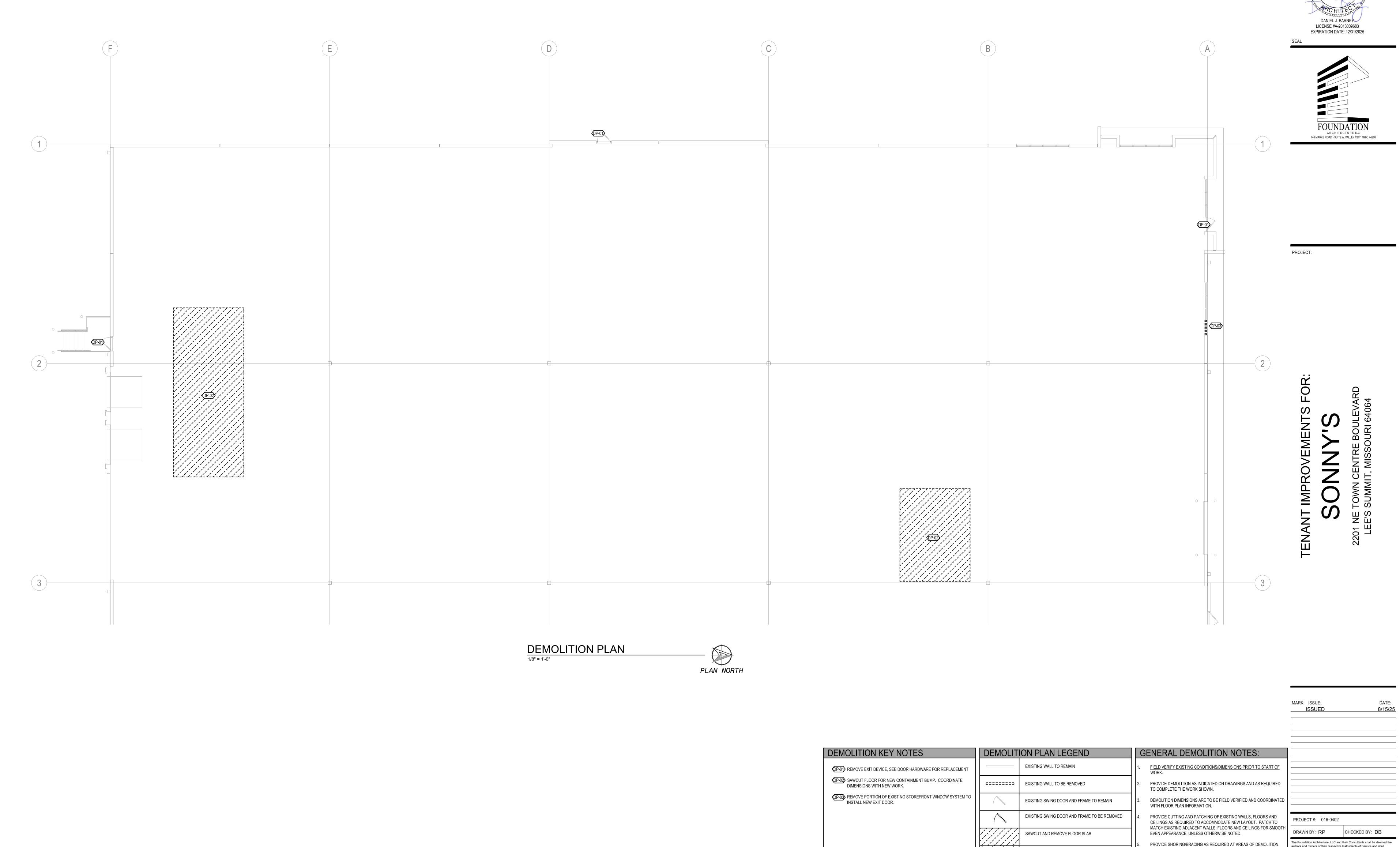
3.8. AVAILABILITY OF MAINTENANCE SERVICE AND SOURCE OF REPLACEMENT MATERIALS.

- FOR ARCHITECT'S RECORD + ONE COPY / SAMPLE FOR CONSULTING ENGINEER'S RECORD (WHEN APPLICABLE) + ONE COPY / SAMPLE FOR CLIENT'S RECORD (VERIFY WITH GC PRIOR TO SUBMITTAL).
- 5. BASIS-OF-DESIGN PRODUCT SPECIFICATION: WHERE A SPECIFIC MANUFACTURER'S PRODUCT IS NAMED AND ACCOMPANIED BY THE WORDS "BASIS OF DESIGN." INCLUDING MAKE OR MODEL NUMBER OR OTHER DESIGNATION. TO ESTABLISH THE SIGNIFICANT QUALITIES RELATED TO TYPE, FUNCTION, DIMENSION, IN-SERVICE PERFORMANCE, PHYSICAL PROPERTIES, APPEARANCE, AND OTHER CHARACTERISTICS FOR PURPOSES OF EVALUATING COMPARABLE PRODUCTS OF OTHER NAMED MANUFACTURERS.





	MARK: ISSUE: ISSUED		DATE: 8/15/25
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	PROJECT #: 016-0402		
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	The Foundation Architecture, LLC and tauthors and owners of their respective I retain all common law, statutory and oth copyrights. The Instruments of Service additions or alterations to this Project or the prior written agreement of The Foundation Architecture of the Instruments of and without liability to The Foundation Architecture.	nstruments of Service and er reserved rights, includir shall not be used for future for other projects, without dation Architecture, LLC. Service shall be at the Own	shall ng Any ner's sole risk r Consultants
	DRAWING TITLE:		
	LIFE SAFETY	PLAN	



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The Foundation Architecture, LLC © 2025 DRAWING TITLE: OVERALL DEMOLITION PLAN

STRUCTURE SHALL BE SELF-SUPPORTING AFTER DEMOLITION IS

COORDINATE ASPECTS OF DEMOLITION PLAN WITH NEW FLOOR,

REQUIRED MEANS OF EGRESS SHALL BE MAINTAINED DURING

CONSTRUCTION AND RENOVATION TO THE BUILDING.

ELECTRICAL AND PLUMBING DRAWINGS.

OF THE ASSEMBLY BEING PENETRATED.

DURING CONSTRUCTION.

EQUIPMENT AND REFLECTED CEILING PLANS, AS WELL AS MECHANICAL,

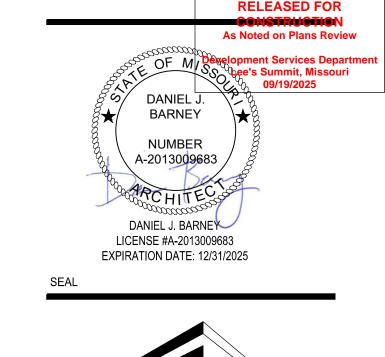
EXISTING FIRE DEPARTMENT VEHICLE ACCESS SHALL BE MAINTAINED

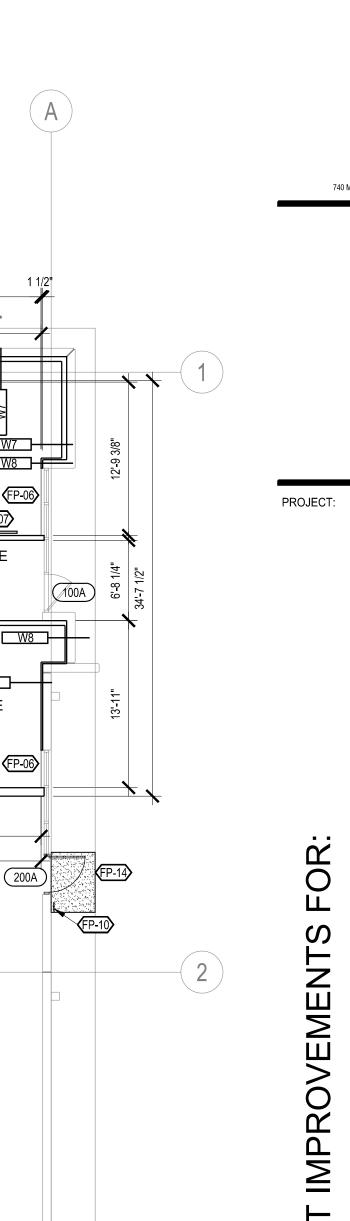
FIRE RATED ASSEMBLIES DISRUPTED DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL RATING OR BETTER.

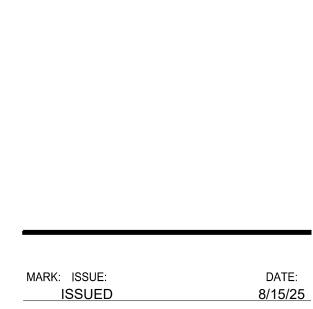
ANY NEW PENETRATIONS TO A FIRE RATED ASSEMBLY SHALL BE

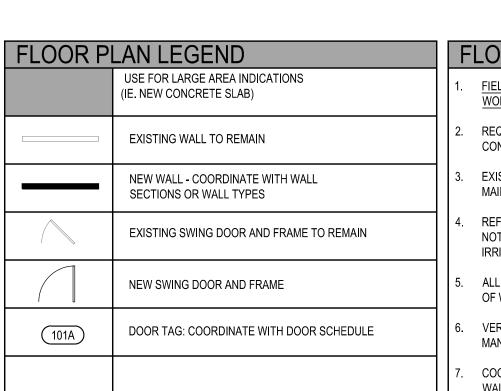
REMOVE EXISTING CEILING

CONSTRUCTED ACCORDING TO AN UL ASSEMBLY MATCHING THE RATING









FLOOR PLAN GENERAL NOTES FIELD VERIFY EXISTING CONDITIONS/DIMENSIONS PRIOR TO START OF WORK.

- REQUIRED MEANS OF EGRESS SHALL BE MAINTAINED DURING CONSTRUCTION AND RENOVATION TO THE BUILDING.
- EXISTING FIRE DEPARTMENT VEHICLE ACCESS SHALL BE IDENTIFIED AND MAINTAINED DURING ALL PHASES OF CONSTRUCTION.
- REFER TO CIVIL DRAWINGS FOR SITE IMPROVEMENTS INCLUDING BUT NOT LIMITED TO: SIGNAGE, SIDEWALKS, CURBS, SITE SIGNAGE, IRRIGATION AND STORM WATER MANAGEMENT.
- ALL DOOR OPENINGS ARE TO BE LOCATED 6" FROM INTERIOR CORNER

COORDINATE ALL FLOOR DRAIN LOCATIONS WITH THE PROJECT

PLUMBING DRAWINGS.

- OF WALL UNLESS NOTED OTHERWISE. VERIFY ALL ROUGH OPENINGS FOR NEW DOORS AND WINDOWS WITH MANUFACTURER'S REQUIREMENTS.
- COORDINATE LOCATIONS OF FIRE EXTINGUISHERS AND SEMI-RECESSED WALL CABINETSWITH LIFE SAFETY PLAN ON SHEET G0.02.

PROJECT #: 016-0402

DRAWN BY: RP

DRAWING TITLE:

FLOOR PLAN

CHECKED BY: DB

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CONTAINMENT BUMP __ EXISTING COMPACTED GRAVEL UNDISTURBED SOIL AND STONE SETTING BED SHOWN LIGHT FOR COORDINATION (TYP.) TYPICAL CONCRETE BUMP DETAIL FORK - TRUCKS

EXISTING SLAB SLAB ON GRADE ----

RODS @ 12" O.C. (6" EMBED.) AT MID-DEPTH OF EXISTING SLAB

PROVIDE #5 x 1'-6" DOWEL

NEW CAST-IN PLACE (5,000 PSI)

CONCRETE CONTAINMENT BUMP WITH

#5 16" O.C. EACH WAY OVER NEW 6

/ NEW CONCRETE CURB

#6 X 9" EPOXY SET REBAR DOWEL AT 32" OC WITH 4"

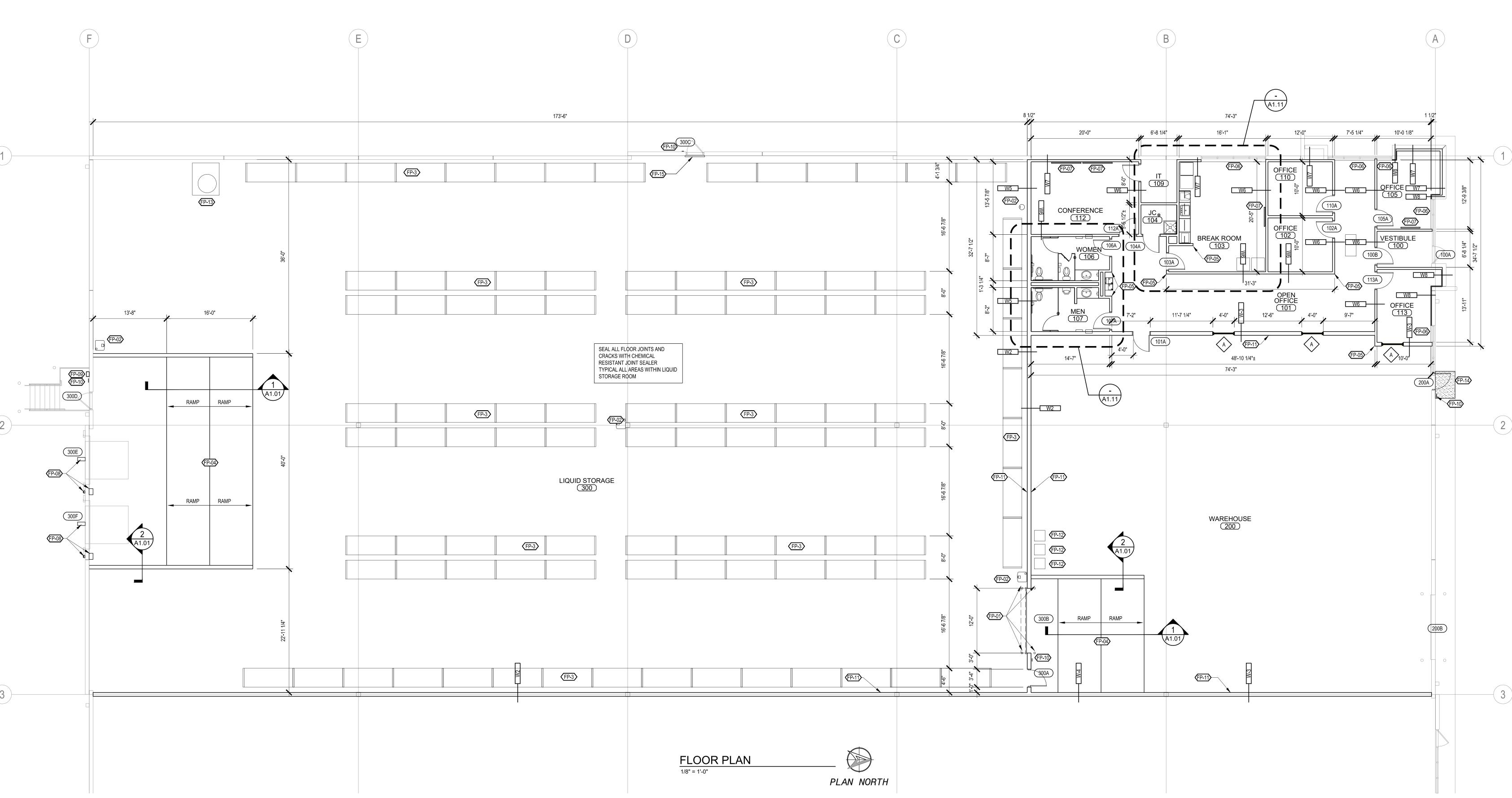
EXISTING CONCRETE SLAB

EMBEDMENT ,

2 TYPICAL CONCRETE CURB
3/4" = 1'-0"

CONT #6 REBAR DOWEL WITH

15" LAPS ———



FLOOR PLAN KEY NOTES

FP-3 NEW STORAGE RACKING SYSTEM TO BE PROVIDED AND INSTALLED BY RACKING SUPPLIER; LAYOUT SHOWN FOR COORDINATION ONLY

FP-08 INSTALL NEW TRAILER RESTRAINT, SIGNAL LIGHT & CONTROL PANEL SIMILAR OR EQUAL TO STAR 4 VEHICLE RESTRAINT MFR'D BY KELLY.

FP-04 NEW CAST-IN PLACE CONCRETE CONTAINMENT BUMP

(FP-05) 4'-0" CORNER GUARD PROTECTION, MATCH WALL COLOR

FP-10 INSTALL NFPA 704 PLACARD TO BE PLACED AT DOOR

FP-01 4" DIA CONCRETE FILLED GUARD POST

FP-06 PROVIDE SOLID SURFACE WINDOW SILL

FP-07 TV BY OWNER

FP-09 INSTALL KNOX BOX

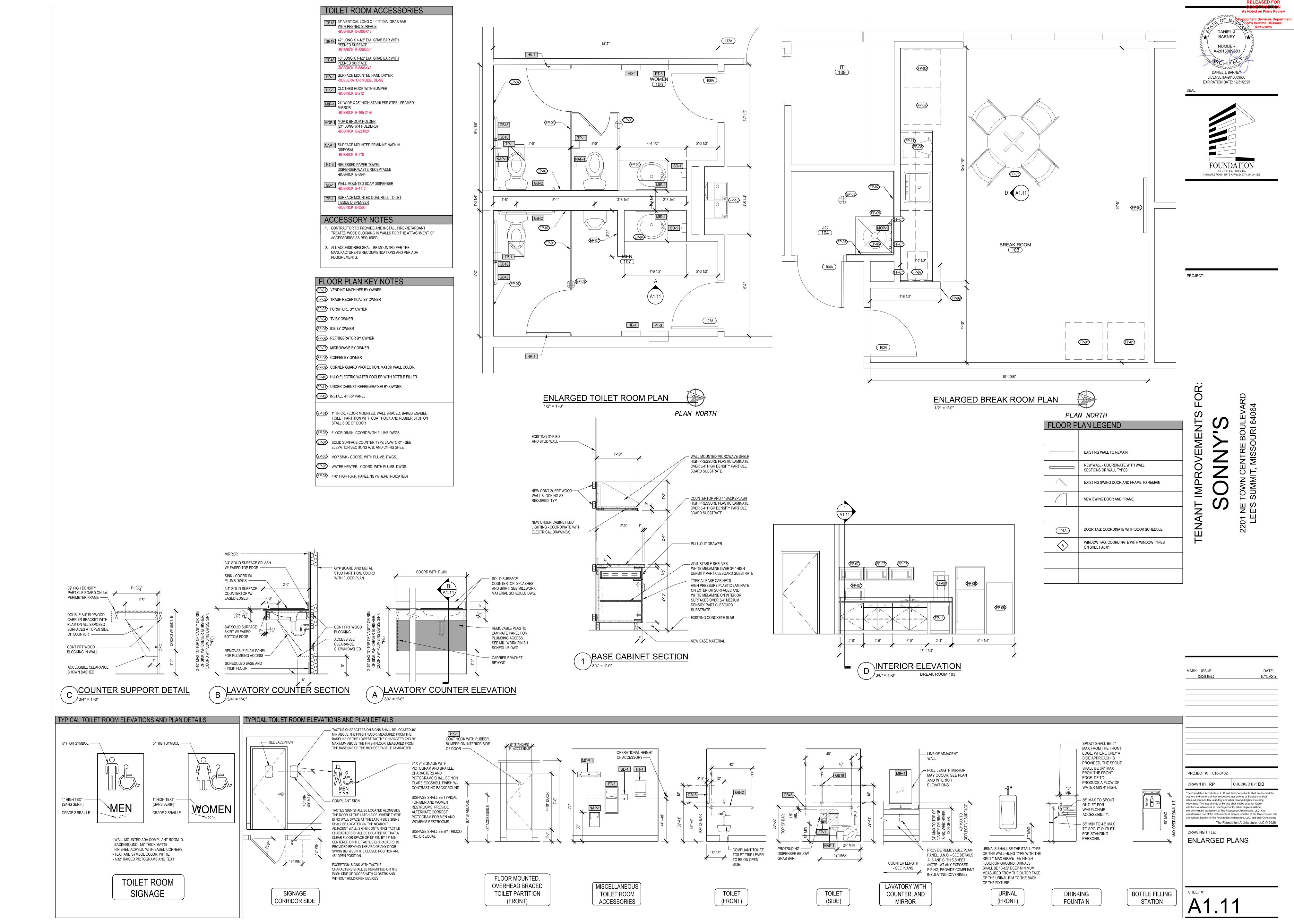
(FP-11) PAINT 2 ON WALLS

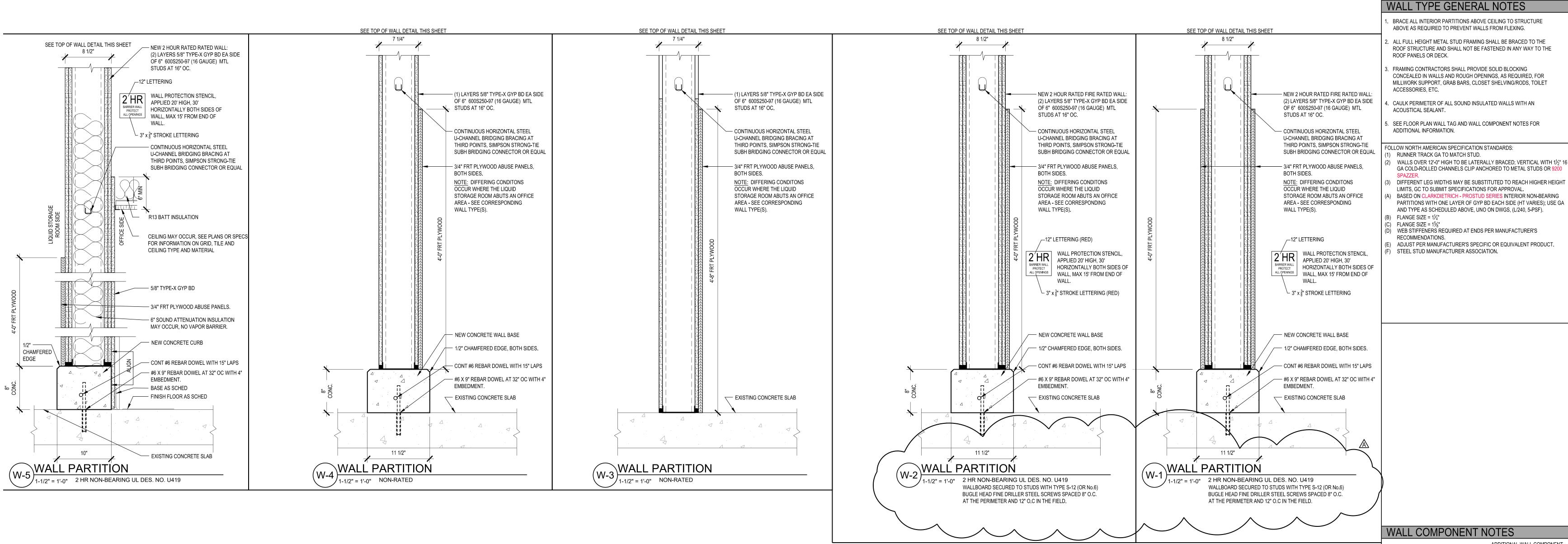
(FP-12) CHARGERS, SEE ELECTRICAL

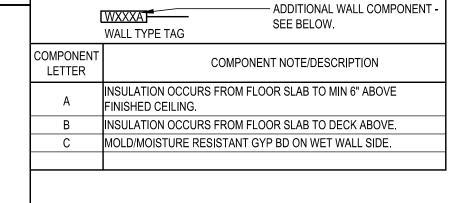
FP-13 SCALE/WRAPPER BY OWNER

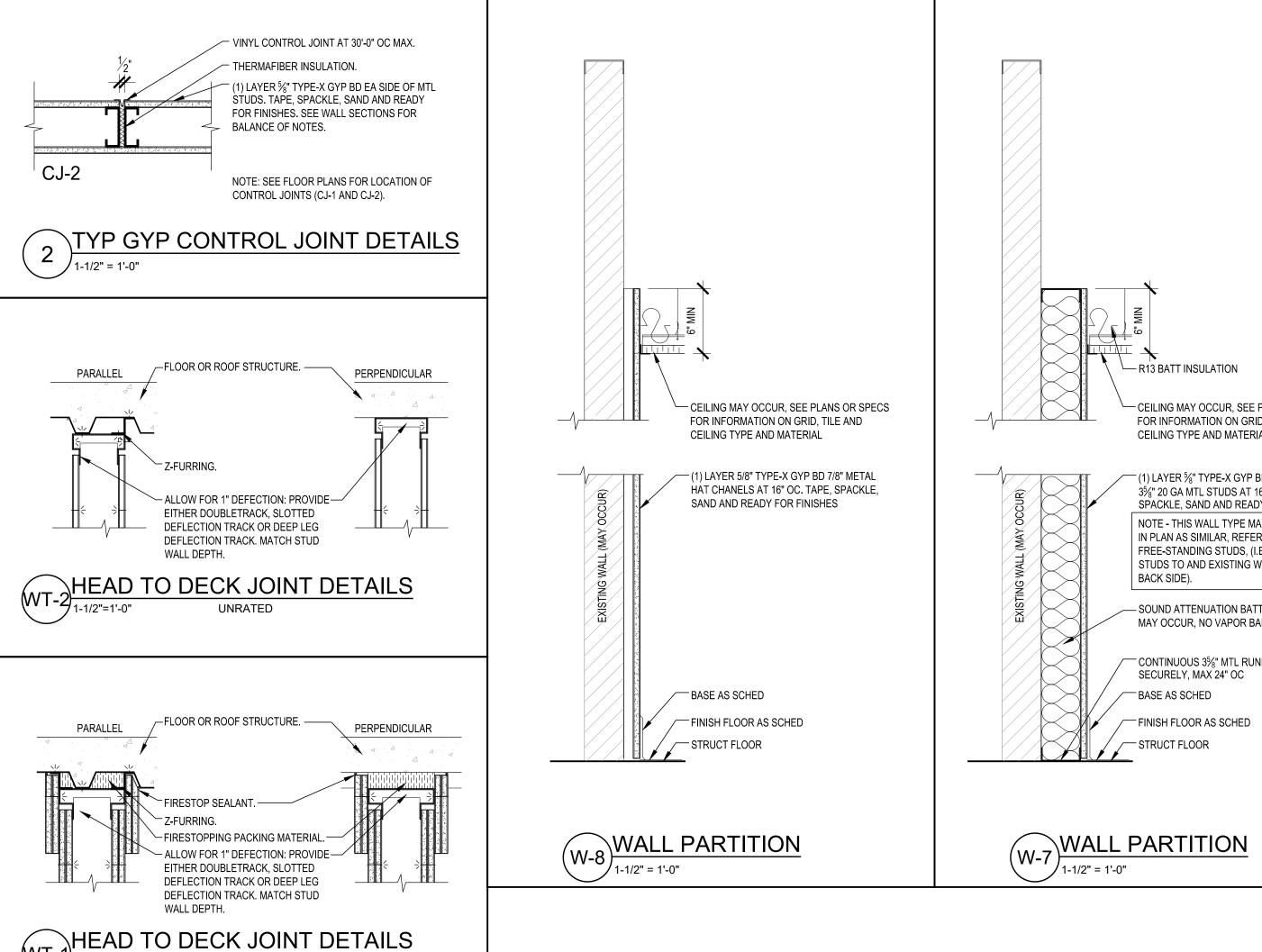
FP-14 NEW 4" REINFORCED CONCRETE WALK, EXTEND TO PAVEMENT

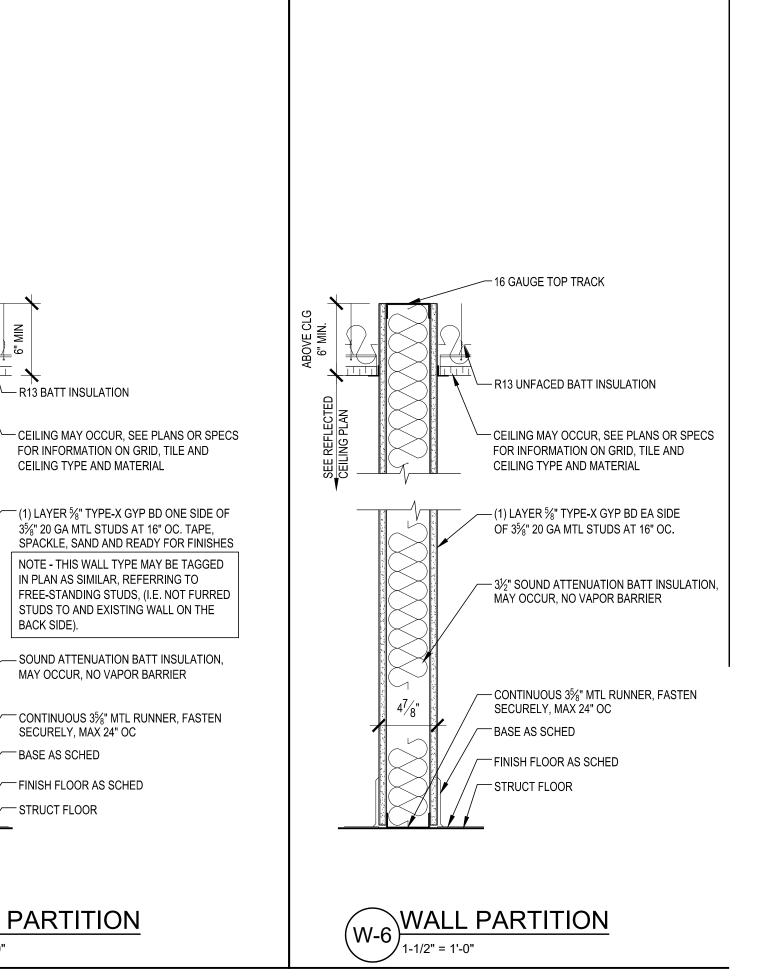
FP-02 NEW EMERGENCY EYE WASH STATION; REFER TO PLUMBING DRAWINGS FP-15 PROVIDE AND INSTALL NEW PIG, BUILD-A-BERM, SELF-RISING DRIVE-OVER











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ARCHITECTURE, LLC
740 MARKS ROAD - SUITE A, VALLEY CITY, OHIO 44208

RELEASED FOR

As Noted on Plans Review

OF My Revelopment Services Department bee's Summit, Missouri 09/19/2025

BARNEY

NUMBER

A-2013009683

DANIEL J. BARNEY

LICENSE #A-2013009683

EXPIRATION DATE: 12/31/2025

SOUND SOULEVARD

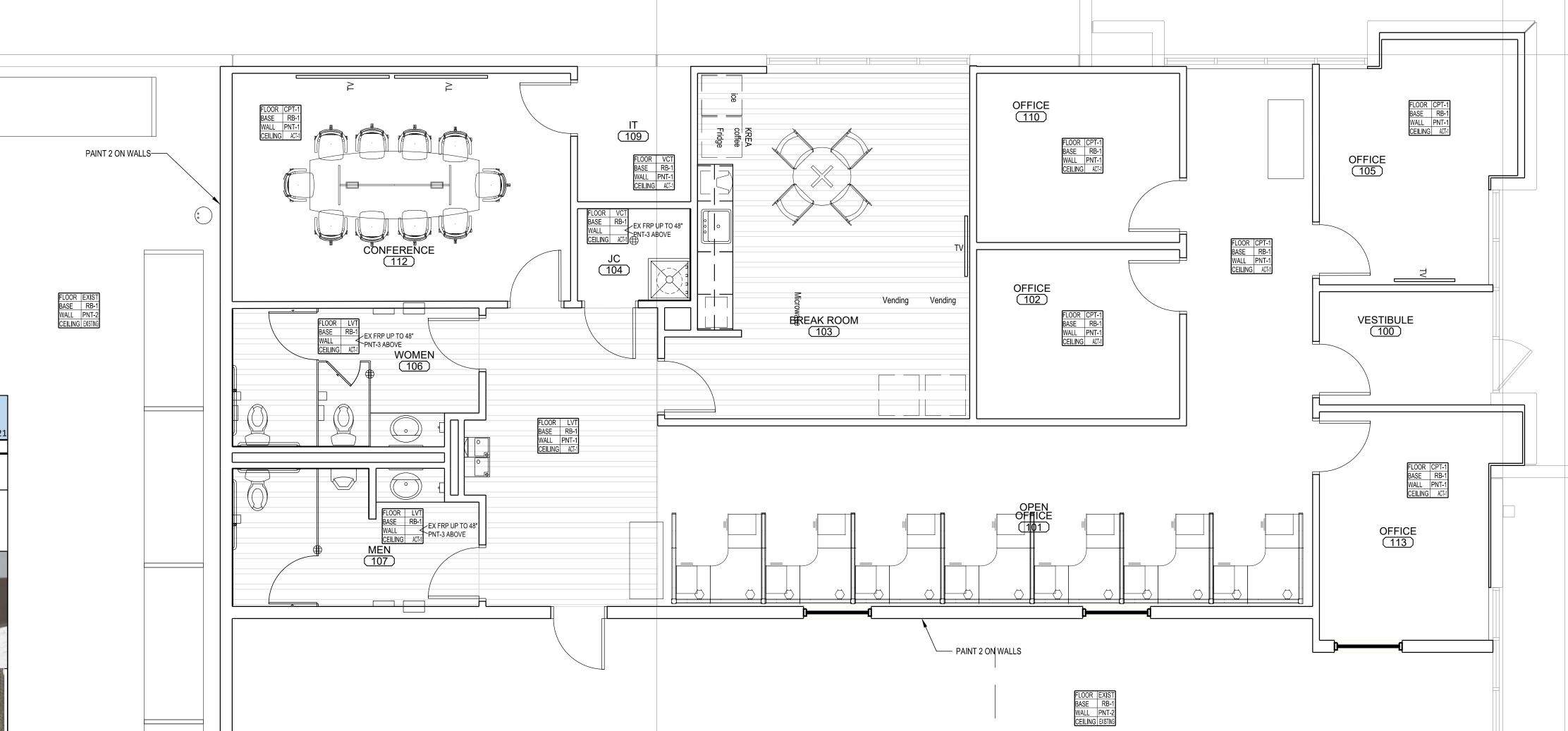
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A ADDENDUM A	XX

PROJECT #: 016-0402	
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DRAWING TITLE:
WALL TYPES
AND DETAILS



ROOM FINISH PLAN

ROOM FINISH NOTES 1. PREP ALL WALLS TO RECEIVE SCHEDULED FINISH. 2. PREP ALL FLOORS TO RECEIVE SCHEDULED FINISH. . INSTALL METAL DIVIDER STRIPS AT ALL TRANSITIONS BETWEEN CERAMIC TILE, RUBBER AND CARPETING SURFACES UNLESS OTHERWISE NOTED.

SUBSURFACE TOLERANCES: FOR TILES WITH ALL EDGES SHORTER THAN 15", MAXIMUM ALLOWABLE VARIATION IS 1/4" IN 10' FROM THE REQUIRED PLANE, WITH NO MORE THAN 1/16" VARIATION IN 12" WHEN MEASURED FROM THE HIGH POINTS IN THE SURFACE. FOR TILES WITH AT LEAST ON EDGE 15" IN LENGTH,

MOVEMENT JOINTS SHALL BE PROVIDED IN ALL PORCELAIN TILE FLOORS. PROVIDE MOVEMENT JOINTS 20' TO 25' IN EACH DIRECTION WHERE PORCELAIN TILE FLOORS ARE EXPOSED TO DIRECT SUNLIGHT.

APPLY SELF LEVELING COMPOUND AND/OR TROWEL-ABLE LEVELING COMPOUND AS REQUIRED TO

PROVIDE A SMOOTH, LEVEL FLOOR SURFACE TO RECEIVE NEW FLOOR FINISHES.

MAXIMUM ALLOWABLE VARIATION IS 1/8" IN 10' FROM THE REQUIRED PLANE, WITH NO MORE THAN 1/16" VARIATION IN 24" WHEN MEASURED FROM THE HIGH POINTS IN THE SURFACE. TILE FLOOR AND WALL FINISHES SHALL BE INSTALLED PER THE COUNCIL OF NORTH AMERICA, INC. (TCNA)

CURRENT STANDARDS.

3. INSTALL CRACK ISOLATION MEMBRANE OVER ALL SAW CUTS IN CONCRETE FLOOR SLABS SCHEDULED TO

RECEIVE NEW FLOOR TILE.

9. FINISHES NOT SPECIFIED SHALL BE SELECTED BY TENANT AND APPROVED BY ARCHITECT.

13. ALL MATERIALS AND FINISHES SHALL BE NEW UNLESS OTHERWISE NOTED.

14. PAINTING THROUGHOUT SHALL BE (1) COAT PRIMER, (2) COATS FINISH PAINT.

15. LATEX PAINT ON WALLS AND ALKYD SATIN ON METAL AND WOOD SURFACES.

16. ALL PRE-PRIMED H.M. DOORS AND FRAME SHALL RECEIVE (2) FINISH COATS OF PAINT.

17. INSTALL MOISTURE RESISTANT (MR) GYPSUM BOARD WHERE CERAMIC WALL TILE OCCURS AND ON ALL PLUMBING FIXTURE WALLS.

18. REFER TO OWNER APPROVED COLOR SCHEDULE FOR FINAL COLOR, STYLE AND MANUFACTURER

19. ALL GYPSUM BOARD, GLASS MAT AND FIBER REINFORCED GYPSUM PANEL SURFACES SHALL HAVE THE MINIMUM LEVEL OF FINISH (LEVELS 0 THROUGH 5) LISTED BELOW PRIOR TO THE APPLICATION OF ANY DECORATIVE FINISH (IE. PAINT, WALLCOVERING, ETC.) UNLESS SPECIFICALLY NOTED OTHERWISE. THE LEVEL OF FINISH SHALL BE IN COMPLIANCE WITH THE GYPSUM ASSOCIATIONS GA-214 "LEVELS OF FINISH FOR GYPSUM PANEL PRODUCTS":

LEVEL 0 - TEMPORARY CONSTRUCTION OR WHENEVER A FINAL DECORATIVE FINISH HAS NOT BEEN

LEVEL 1 - SMOKE BARRIER APPLICATIONS AND PLENUM AREAS ABOVE CEILINGS AND IN NON-VISIBLE

LEVEL 2 - SUBSTRATE FOR TILE AND AREAS (AS SPECIFIED BY ARCHITECT) WHERE SURFACE APPEARANCE IS NOT A CONCERN.

LEVEL 3 - SUBSTRATE FOR APPLICATION OF CONTINUOUS HEAVY- OR MEDIUM-TEXTURE FINISHES (SPRAY OR HAND APPLIED) BEFORE FINAL PAINTING.

LEVEL 4 - SUBSTRATE FOR FLAT PAINTS (0 TO 5 GLOSS UNITS AT A 60° ANGLE AND 0 TO 10 GLOSS UNITS

AT AN 85° ANGLE), LIGHT TEXTURES AND NON-CONTINUOUS TEXTURES. LEVEL 5 - SUBSTRATE FOR NON-FLAT PAINTS (GREATER THAN 5 GLOSS UNITS AT A 60° ANGLE AND GREATER THAN 10 GLOSS UNITS AT AN 85° ANGLE) OR OTHER GLOSSY DECORATIVE FINISHES,

DARK/DEEP TONE PAINTS, COMMERCIAL GRADE WALLCOVERINGS AND AT AREAS WITH CRITICAL

20. GC TO PROVIDE SHOP DRAWING/SUBMITTALS OF ALL SPECIFIED FINISHES FOR APPROVAL PRIOR TO

LIGHTING CONDITIONS.

RESULTS FROM NFPA 255, ASTM E-84 OR UL723."

SUBSTITUTION.

21. NO SUBSTITUTIONS TO SPECIFIED MATERIALS AN/OR BRANDS OF MATERIALS WILL BE ACCEPTED UNLESS APPROVED BY THE ARCHITECT, IN WRITING, PRIOR TO CONSTRUCTION. ANY CONTRACTOR REQUESTING SUBSTITUTIONS SHALL SUBMIT SIX (6) COPIES OF DRAWINGS OR ELECTRONIC COPY, AND/OR PRODUCT LITERATURE ALONG WITH THE AMOUNT OF COST SAVINGS FOR THE ITEM IN QUESTION. THE CONTRACTOR MUST ALLOW THE ARCHITECT AT LEAST SEVEN BUSINESS DAYS TO DETERMINE THE SUITABILITY OF THE

22. COORDINATE WITH CODE INVESTIGATION FOR FLAME SPREAD AND SMOKE DEVELOPMENT RESTRICTIONS ROOM FINISH PLAN FOR ALL INTERIOR MATERIALS / FINISHES.

23. PER NFPA 101 LIFE SAFETY CODE CHAPTER 10 INTERIOR FINISHES, CONTENTS AND FURNISHINGS, PARAGRAPH 10.2.3 INTERIOR WALL OR CEILING FINISH TESTING AND CLASSIFICATION STATES "INTERIOR WALL OR CEILING FINISH THAT IS REQUIRED ELSEWHERE IN THE CODE TO BE CLASS A, B, OR C SHALL BE CLASSIFIED BASED ON TEST

24. PAINTING OF GALVANIZED METAL SURFACES REQUIRES THE GALVANIZED METALS PROTECTIVE LAYER OF OIL / PASSIVATOR TO BE COMPLETELY REMOVED. REMOVAL OF THE OIL AND PASSIVATOR MUST BE TESTED BY CLEANING A SMALL AREA WITH A WATER-BASED OR SOLVENT-BASED CLEANER. ONCE THAT AREA IS DRY, TEST THE CLEAN AREA WITH A COPPER SULFATE SOLUTION. IF THE GALVANIZED SURFACE DOES NOT TURN BLACK, THE PASSIVATOR REMAINS ON THE SURFACE, THIS MUST BE REMOVED PER THE SSPC-SP7 / NACE PREPARATION PRECEDURE AND RE-TESTED PRIOR TO COATING THE SURFACE.

PROJECT #: 016-0402

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8/15/25

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LUXURY VINYL PLANK	LVT-1	SHAW CONTRACT / TERRAIN II	000170 WILLOW	.\Images\Screenshot 2025-01-27 123259 WILLOW.jpg
4" RUBBER BASE	RB-1	JOHNSONITE	283 TOAST	
Door trim paint	PNT-4	Sherwin Williams Promar200 Interior	Color match base	
CARPET TILE	CPT-1	SHAW CONTRACT, Carpet Tile 5T079	Area 78762	
Solid Core wood doors with PL	Doors	Solid core wood door with rotory cut White Berch veneer as manufactured by Marshfield or approved equal		
		Prefinished cabinetry made with with rotory cut White Berch veneer as manufactured by Marshfield or approved equal.		* CANDA M
Cabinets	Cabinets	Match Doors. Note for renovations to existing facilities, cabinetry shall be plastic laminate to match existing doors.	Nutmeg 48-97 White Birch	
Toilet Room Solid Surface Countertop	SS-1	Wilsonart Solid Surface	Blustone 9075EA	
Tollet Room Solid Surface Countertop	33-1	Wilsonart Solid Surface	Biustoile 90/3EA	
BreakRoom Laminate Counters	PL-1	Wilsonart Plastic Laminate	Bianco Romano 1872-38	
Entrancy Lobby - CERAMIC tile	CT-1	Crossville tile 12x24		
Entrancy Lobby - CERAMIC tile base	CT-1	Crossville tile 4" tile base	Color: Physics - Nucleus	
FIBERGLASS REINFORCED PANEL	FRP-1	Color to be selected by Architect		
				Fine Grain
WALL PAINT	PNT-1	Sherwin Williams Promar200 Interior	Color Match - DUNN-EDWARDS DE6213 FINE GRAIN	DE6213
CEILING PAINT & WAREHOUSE WALLS	PNT-2	Sherwin Williams Promar200 Interior	Flat White	
	DNT 3	Chamain Williams Bassas 200 lateries	Colo9r Match - Dunn Edwards Foggy	Foggy Day DE6226
toilet room wall paint Toilet room wall paint epoxy	PNT-3E	Sherwin Williams Promar200 Interior Sherwin Williams HP Pre-Catalyzed Waterborne Epoxy Semi-Gloss	Day DE6227 Color Match - Dunn Edwards Foggy Day DE6227	
Vinyl Tile	VCT-1	Armstrong - Standard Excelon Imperial Texture	51911 Classic White	All and the second seco

Dune Second Look 9/16 grid 2722

Sonny's Finish Schedule

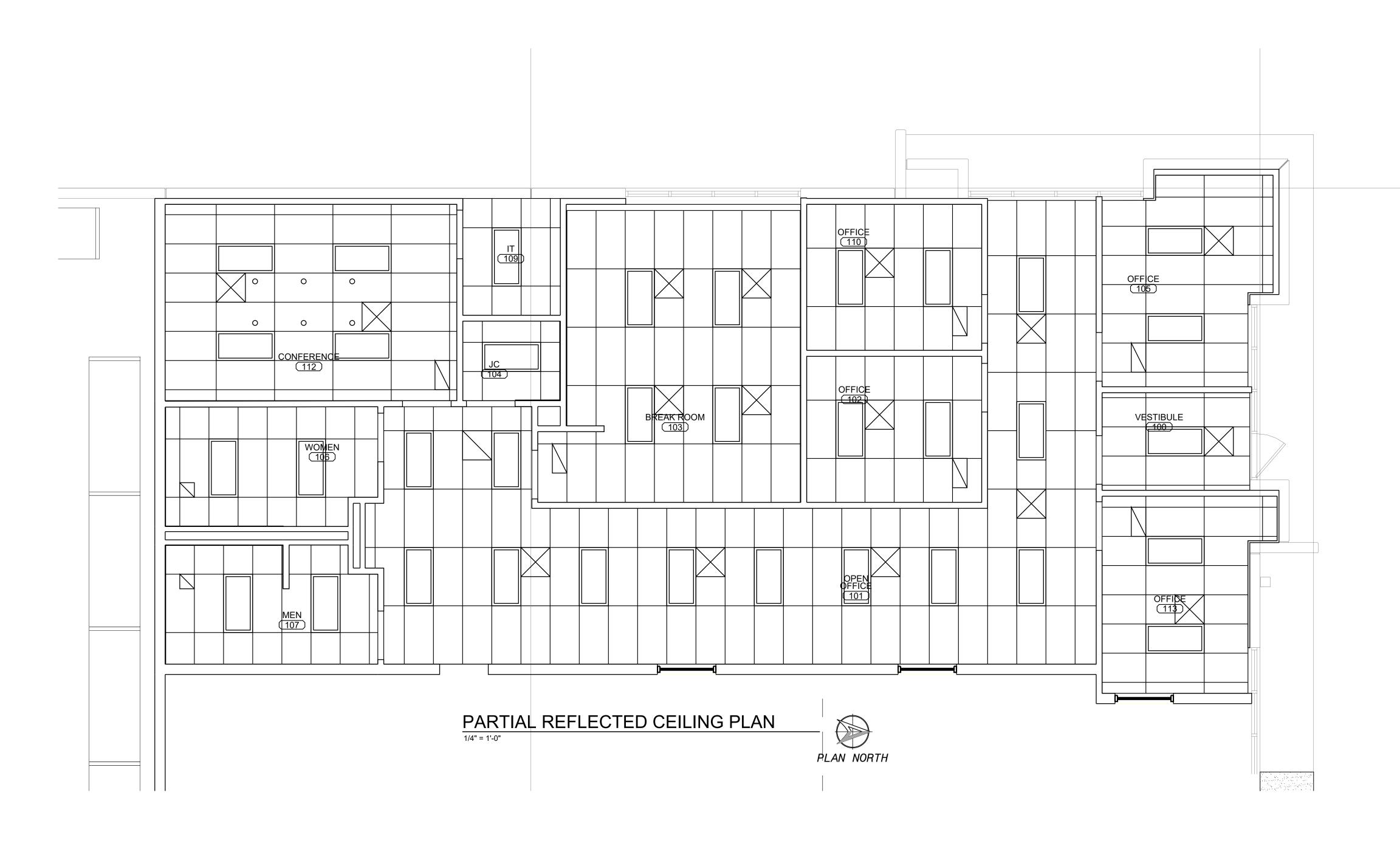
TAG Specification

POLYURETHANE SEALER

Description

Sealed Concrete

Ceiling tile Xref C:\Users\rbenton\Downloads\TFA Titleblock24x36.dwg



	NEDAL NOTEC NOTEC		RELEAS CONSTI
1. COORDINAL ETC WITH M 2. ALL AREAS 3. GENERAL COUNTRY SUBCONTRY	TE LOCATIONS OF LIGHTS, GRILLS, DIFFUSERS, SPEAKERS, MECHANICAL AND ELECTRICAL DRAWINGS. SHALL BE FULLY SPRINKLERED. CONTRACTOR TO COORDINATE WITH FIRE PROTECTION ACTOR AND APPROVED FIRE PROTECTION SHOP	BA NU	As Noted on My Development Service's Summon 19/15 NIEL J. RNEY MBER 3009683
DRAWINGS	FOR QUANTITY AND LOCATIONS OF SPRINKLER HEADS.	DANIEL LICENSE #	HITEC 2008 MITEC 2008 J. BARNEY A-2013009683 DATE: 12/31/2025
CEILING	PLAN LEGEND		
	EXISTING 2 X 4 ACOUSTICAL CEILING TILE		NDATION HITECTURE, LLC SUITE A, VALLEY CITY, OHIO 44208
	2 X 4 ACOUSTICAL CEILING TILE MATCH EXISTING		
	2'x4' LAY-IN LIGHT FIXTURE		
0	RECESSED CAN LIGHT FIXTURE	PROJECT:	
	SUPPLY AIR DIFFUSER RETURN AIR GRILLE		
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		TENANT IMPROVEMENTS FOR	2201 NE TOWN CENTRE BOULEVARD LEE'S SUMMIT, MISSOURI 64064
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PROJECT #: 016-0402		
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DRAWING TITLE:
PARTIAL REFLECTED
CEILING PLAN

SHEET #:
A1.51

DOOR HARDV	*/ \(\C_	MED MODELNO	EINHOLL	DEMARKS
HARDWARE ITEM	INTERIOR	MFR MODEL NO.	FINISH	REMARKS STAINLESS STEEL WITH NON-RISING
HINGES	INTERIOR	_		REMOVABLE PINS STAINLESS STEEL WITH NON-RISING
	EXTERIOR		000	REMOVABLE PINS
		OREROOM 26D		
	CLASSROOM 26D			
BORED	OFFICE		26D	LEVER TYPE - INTERCHANGEABLE CORES
OCKSETS	PRIVACY		26D	
	PASSAGE		26D	
	EXIT		26D	
IORTISED	LOCKSET		26D	
OCKSET	CYLINDER		26D	
	STOREROOM	MATCH EXISTING		STANDARD ARM WITH HOLD OPE
CLOSERS	STOREFRONT			STANDARD ARM
<u>.</u>	HOTEL GUEST ROOM			STANDARD ARM
	HEAVY DUTY			
COORDINATOR				
EADBOLT LOCK				
EADBOLT LEVER				"LOCKED" OR "OPEN" INDICATOR
HUMBTURN CYLINDER				
ANIC HARDWARE	EXIT DEVICE			
ANIC TRIM	EXIT DEVICE		26D	
ANIC HARDWARE	UPGRADE			
TRIKE	DUST PROOF		26D	
ATCH PROTECTION PLATE			32D	
IGHT LATCH	DOOR GUARD		26D	
STRAGAL	DUST PROOF			MATCH DOOR COLOR
USH/PULL	DUST PROOF		26D	
LITO 51 LIQUEDOLTO	WOOD DOORS	MATCH EXISTING	32D	
UTO FLUSH BOLTS	METAL DOORS		32D	
IANUAL FLUSH BOLTS			26D	
PROTECTION (KICK) PLATE			32D	
PROTECTION (KICK) PLATE	UPGRADE		32D	
VALL BUMPER				
LOOR STOPS				
CHAIN DOOR CHECK				
ECHANICAL KEY PAD				
SADDLE THRESHOLD				
BASKETING SET				
SWEEPS				
DRIP CAP				
PEEP HOLE	DOOR VIEWER		26D	
·				

2 (1) A DETEX BATTERY POWERED

PER LOCAL FIRE DEPARTMENT

REFURBISHED.

— 2 HOUR FIRE-RATED

GYP BD AND METAL

STUD WALL ASSEMBLY

LINE OF PLYWOOD

— DOUBLE STEEL STUD

— STEEL CORNER BEAD

- (2) LAYERS 5/8" FIRE

CODE GYP BD WITH

FIRE TAPED CORNERS

BOTH SIDES

1'-0"

— GYP BD AND METAL

DOUBLE METAL STUD

SEALANT BOTH SIDES

- GYP BD AND METAL STUD

WALL. SEE FLOOR PLAN

AND WALL LEGEND DWGS

— DOUBLE METAL STUD — SEALANT BOTH SIDES

AND RUNNER

TYPICAL.

STUD WALL, SEE FLOOR PLAN AND WALL LEGEND DWGS

ABUSE PANEL BELOW

(DOOR HEIGHT X 1'-0" WIDE) -INSTALL COILING DOOR TRACK

MANUFACTURER'S REQUIREMENTS ——

SYSTEM PER DOOR

COILING DOOR HOOD -**ENCLOSURE ABOVE**

6" DIA EXTRA—

STEEL BOLLARD (PTD) TO BE SLAB MOUNTED WITH \ FLANGED BASE ! AND EXPANSION BOLTS (TYP AT | BOTH SIDES)

COILING DOOR CURTAIN ———

10 GA X 4'-0" HIGH BENT PLATE

FULLY ADHERED TO PLYWOOD

AND GYP BD SURFACES

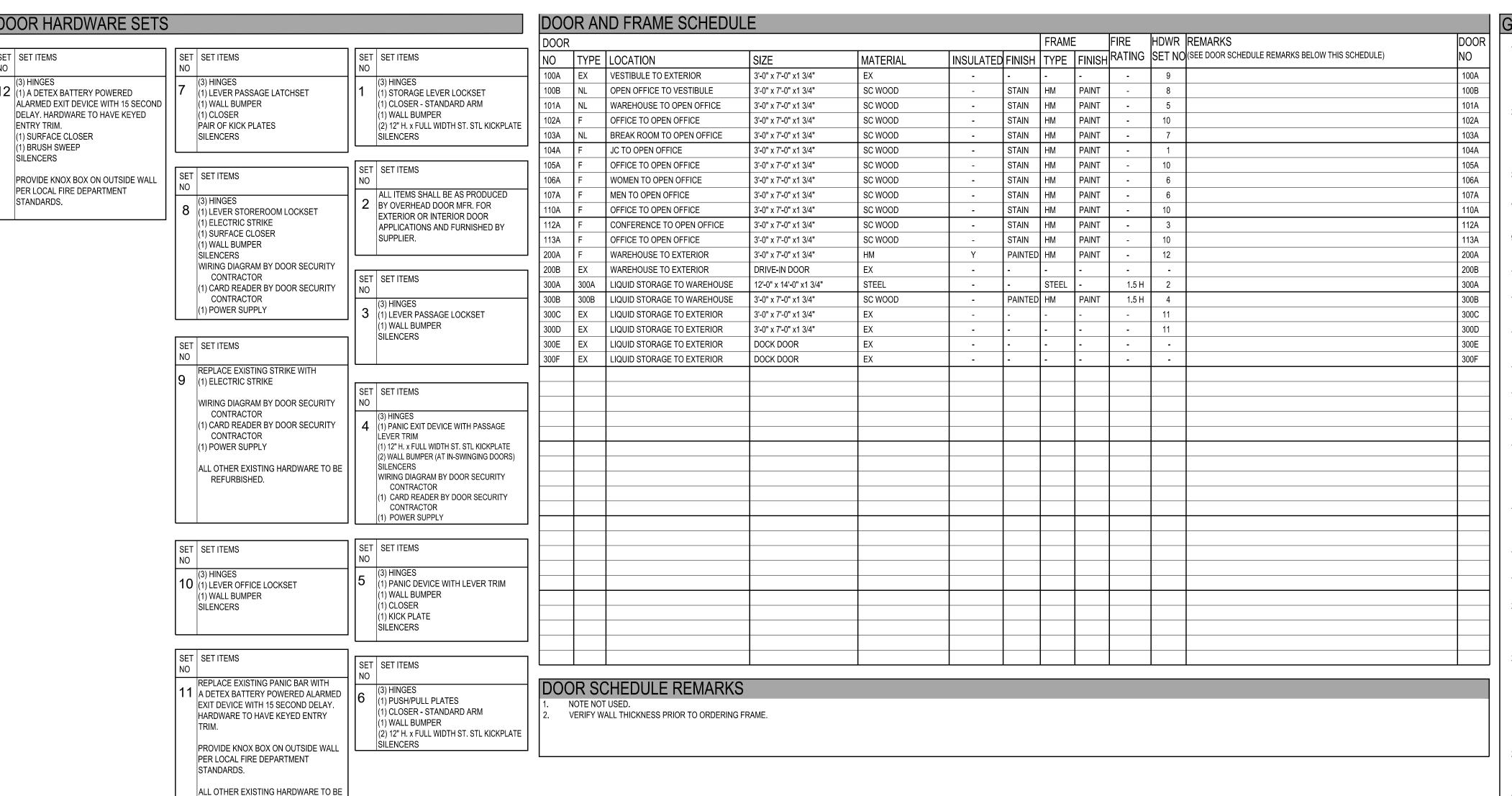
HEAVY-DUTY, CONCRETE FILLED

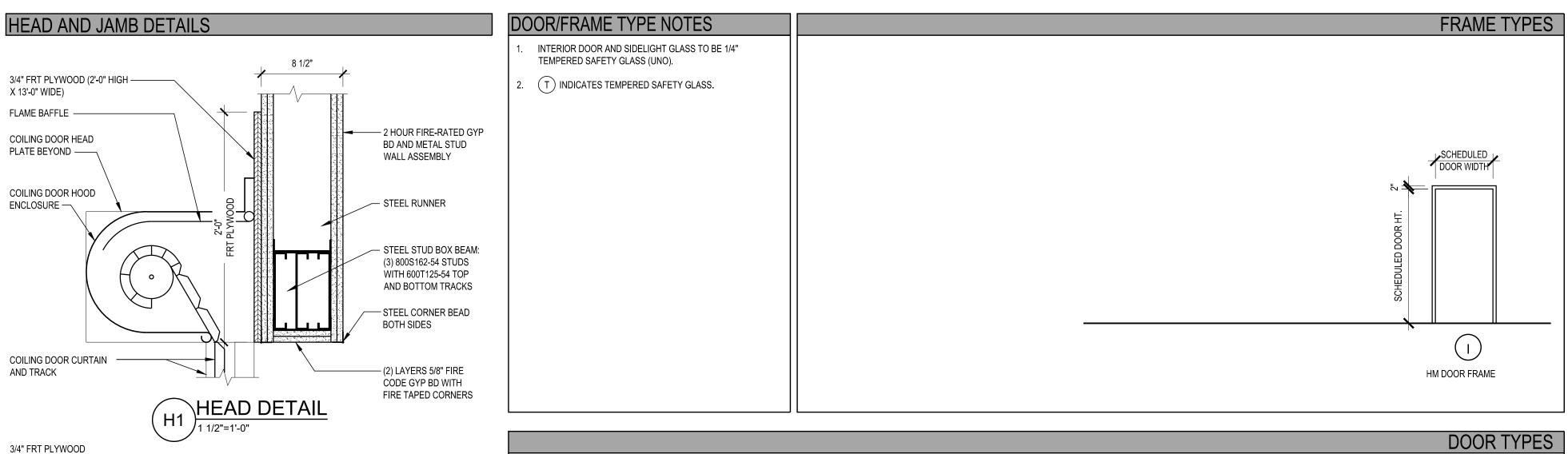
(1) SURFACE CLOSER

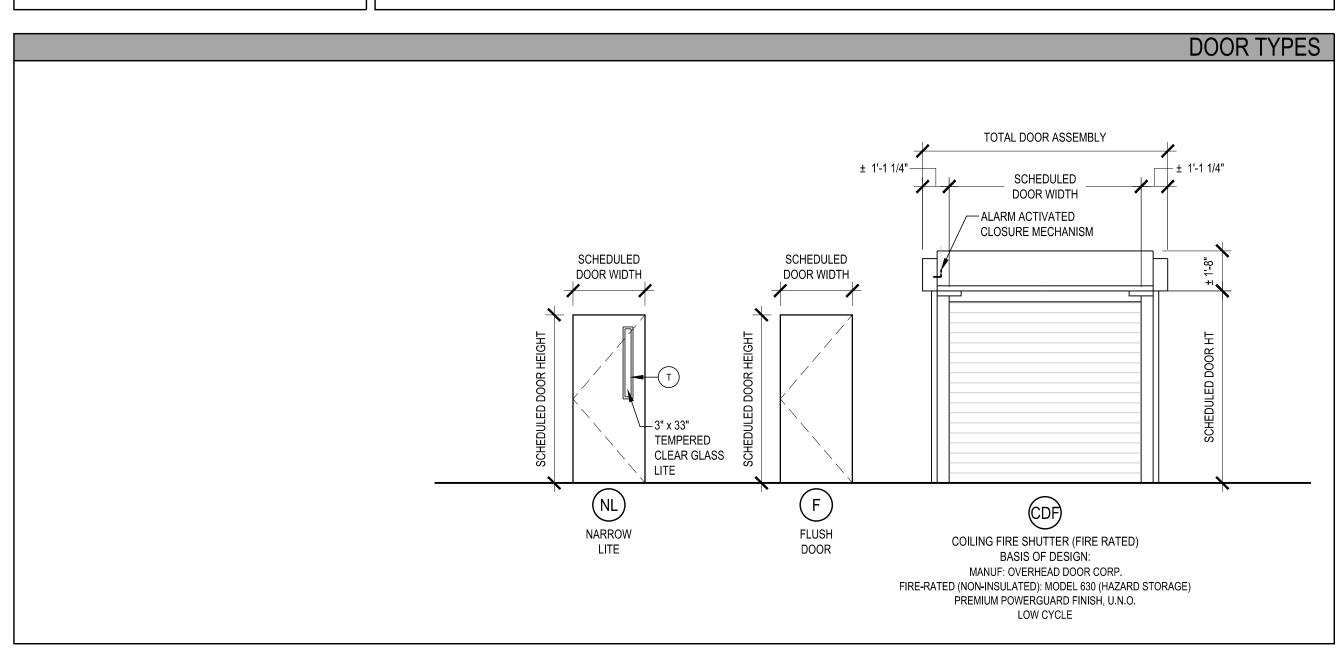
(1) BRUSH SWEEP

NGP = NATIONAL GUARD PRODUCT

HARDWARE FINISH SCHEDULE				
BHMA FINISH CODE	US EQUIV.	FINISH DESCRIPTION	BASE MATERIAL	
626	US 26D	SATIN CHROMIUM PLATED	BRASS/BRONZE	
630	US 32D	SATIN STAINLESS STEEL	STAINLESS STEE	









GENERAL NOTES

EXTERIOR HM DR FRAMES SHALL BE:

1.3. WELDED CONSTRUCTION 1.4. PAINT PER FINISH NOTES EXTERIOR HM DRS SHALL BE:

. PRE-PRIMED

1.2. MIN 14 GA STEEL (GALV)

PRE-PRIMED

2.2. MIN 16 GA STEEL (GALV) 2,3, INSULATED

2.4. PAINT PER FINISH NOTES

INTERIOR HM DR FRAMES SHALL BE: 3.1. MATCH EXISTING

5.1. MATCH EXISTING ALL DOOR HARDWARE ITEMS SHALL BE AS SCHEDULED (OR

ARCHITECT APPROVED EQUAL) UNLESS NOTED ON DOOR HARDWARE DR HARDWARE SUPPLIER SHALL REVIEW ALL HARDWARE FUNCTIONS WITH BUILDING OWNER PRIOR TO SHOP DRAWING SUBMITTALS.

INTERIOR WOOD DOORS ARE TO BE 5-PLY, SOLID PARTICLEBOARD CORE:

ALL NEW DOOR HARDWARE NOT SPECIFIED BUT INDICATED IN THE HARDWARE SCHEDULE SHALL BE SUBMITTED IN THE FORM OF SHOP DRAWINGS TO THE ARCHITECT FOR REVIEW AND APPROVAL. ALL DOOR HARDWARE SHALL BE ACCESSIBLE COMPLIANT INCLUDING: LOCKSETS AND LATCHSETS. LEVER HANDLES - SEE HARDWARE SCHEDULE OR ARCHITECT APPROVED EQUAL. ALL LOUVER INFORMATION (IF REQUIRED; SIZE, STYLE, ETC) SHALL BE COORDINATED WITH MECHANICAL DRAWINGS.

ALL HOLLOW METAL FRAMED DOORS ARE TO RECEIVE DOOR ALL FIRE RATED DOORS AND FRAMES SHALL BEAR THE REQUIRED UL

1/4-INCH, CLEAR, TEMPERED GLASS: IMPACT TESTING. GLAZING SHALL BE TESTED IN ACCORDANCE CPSP 9 SF OR LESS - CLASS I

9 SF OR MORE - CLASS II

REFER TO ELECTRICAL DRAWINGS FOR ALL SECURITY/FIRE HARDWARE INCLUDING (BUT NOT LIMITED TO) PROXIMITY READERS, ELECTRIC STRIKES, BUZZERS, RELEASE BUTTONS, MAGNETIC LOCK, AUTOMATIC SELF CLOSING DEVICES, ETC.

ENSURE THAT ALL DOORS ARE PROPERLY UNDERCUT FOR EASE OF SWING. CUT TO BE NO GREATER THAT 1/4". FRAMES TO RECEIVE BLOCKING WITHIN SURROUNDING PARTITIONS AS REQUIRED TO PROPERLY SUPPORT ALL SPECIFIED HARDWARE.

HARDWARE SUPPLIER TO COORDINATE FINAL DOOR HARDWARE AND ALL KEYING WITH OWNER REPRESENTATIVE. 20.1 PROVIDE ALL KEYS IN INDIVIDUAL ENVELOPES, PROPERLY IDENTIFIED WITH DOOR NUMBERS, LOCATIONS AND KEY

PROVIDE CERTIFIED TEST REPORTS FOR DOOR HARDWARE AT DOORS IN FIRE SEPARATIONS AND EXIT DOORS SHOWING COMPLIANCE WITH SPECIFIED PERFORMANCE CHARACTERISTICS AND PHYSICAL PROPERTIES. PROVIDE NATIONALLY ACCREDITED PRODUCT CERTIFICATES SIGNED BY MANUFACTURER CERTIFYING MATERIALS COMPLY WITH SPECIFIED PERFORMANCE CHARACTERISTICS AND CRITERIA AND PHYSICAL REQUIREMENTS. CONDUCT PRE-INSTALLATION MEETING TO VERIFY PROJECT REQUIREMENTS, MANUFACTURER'S INSTALLATION INSTRUCTIONS AND MANUFACTURER'S WARRANTY REQUIREMENTS.

ALL LOCKSETS LISTED IN HARDWARE SCHEDULE ARE TO BE ANSI COMPLIANT LEVER FUNCTION WITH ANSI STANDARD STRIKES AND BOXES. FINISH(ES) SHALL BE VERIFIED BY ARCHITECT PRIOR TO PRODUCT PURCHÁSE.

USE ONLY FASTENERS PROVIDED BY MANUFACTURER. FAILURE TO COMPLY MAY VOID WARRANTIES AND APPLICABLE LICENSED LABELS. SUPPLY SCREWS, BOLTS, EXPANSION SHIELDS AND OTHER FASTENING DEVICES REQUIRE FOR SATISFACTORY INSTALLATION AND OPERATION OF HARDWARE. EXPOSED FASTENING DEVICES TO MATCH FINISH OF HARDWARE. WHERE PULL IS SCHEDULED ON ONE SIDE OF DOOR AND PUSH PLATE ON OTHER SIDE, SUPPLY FASTENING DEVICES, AND INSTALL SO PULL CAN BE SECURED THROUGH DOOR FROM REVERSE SIDE. INSTALL PUSH PLATE TO COVER FASTENERS. USE FASTENERS COMPATIBLE WITH MATERIAL THROUGH WHICH

PROVIDE CYLINDERS FROM SAME MANUFACTURER AS LOCKSET, 6 PIN MORTISED UNIT. SUPPLY AND INSTALL ALL CYLINDERS, CORES AND KEYS FOR BUILDING BASED ON A GRAND MASTER KEY SYSTEM + 2 ON A SUBMASTER, TO BE COORDINATED WITH THE OWNER.

DOORS AND CABINET LOCKS TO BE GRAND MASTER KEYED. PREPARE DETAILED KEYING SCHEDULE IN CONJUNCTION WITH OWNER. PROVIDE (3) MASTERKEYS FOR EACH MK OR GMK GROUP. STAMP KEYING CODE NUMBERS ON KEYS AND CYLINDERS. PROVIDE CONSTRUCTION CORES. PROVIDE AND INSTALL ALL PERMANENT CORES, CYLINDERS AND KEYS. PROVIDE KEYS IN TRIPLICATE FOR EVERY LOCK IN THIS CONTRACT.

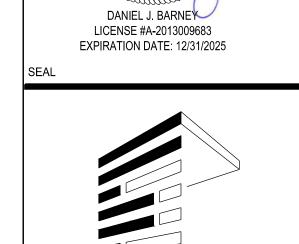
ADJUST DOOR HARDWARE, OPERATORS, CLOSURES AND CONTROLS FOR OPTIMUM, SMOOTH OPERATING CONDITION, SAFETY AND FOR WEATHER TIGHT CLOSURE. LUBRICATE HARDWARE, OPERATING EQUIPMENT AND OTHER MOVING PARTS. ADJUST DOOR HARDWARE TO PROVIDE TIGHT FIT AT CONTACT POINTS WITH FRAMES. PERFORM CLEANING AFTER INSTALLATION TO REMOVE CONSTRUCTION AND ACCUMULATED ENVIRONMENTAL DIRT. CLEAN HARDWARE WITH DAMP RAG AND APPROVED NON-ABRASIVE CLEANER, AND POLISH HARDWARE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS REMOVE PROTECTIVE MATERIAL FROM HARDWARE ITEMS WHERE PRESENT. UPON COMPLETION OF INSTALLATION, REMOVE SURPLUS MATERIALS, RUBBISH, TOOLS AND EQUIPMENT BARRIERS.

BRIEF MAINTENANCE STAFF REGARDING PROPER CARE, CLEANING AND GENERAL MAINTENANCE OF PROJECT COMPLETE HARDWARE DESCRIPTION, USE, HANDLING AND STORAGE OF KEYS, AND USE APPLICATION AND STORAGE OF WRENCHES FOR DOOR CLOSERS, LOCKSETS AND FIRE EXIT HARDWARE. DEMONSTRATE OPERATION, OPERATING COMPONENTS, ADJUSTMENT FEATURES AND LUBRICATION REQUIREMENTS.

DANIEL J. BARNEY NUMBER A-2013009683 DANIEL J. BARNE LICENSE #A-2013009683 EXPIRATION DATE: 12/31/2025

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As Noted on Plans Review



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MARK: ISSUE: ISSUED 8/15/25

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EXTERIOR WALL PENETRATION NOTES:

PROTECTION PIPING SHALL BE BELOW ALL.

COORDINATION NOTES:

CEILING WORK NOTES:

BUILDING'S OCCUPANTS.

1. PENETRATE EXTERIOR BUILDING WALLS AS REQUIRED TO

1. CERTAIN AREAS OF THE BUILDING UTILIZE RETURN AIR CEILING

PLENUMS. ALL MATERIALS INSTALLED WITHIN THE CEILING

2. UNLESS DETAILED OTHERWISE, SYSTEMS SHALL BE ORGANIZED

SHALL BE ROUTED BELOW THE DUCTWORK MAINS, AND FIRE

3. THE BOTTOM ELEVATION OF ALL SYSTEMS SHALL BE AT LEAST 6"

ABOVE LAY-IN CELINGS OR 2" ABOVE LIGHTS TO FACILITATE

CEILING TILE REMOVAL AND MAINTENANCE ACCESS.

INSULATION INSTALLATION (WHERE REQUIRED).

4. SYSTEMS SHALL BE ARRANGED SUCH THAT THEY ARE NOT

TOUCHING EACH OTHER OR ANY PART OF THE BUILDING

STRUCTURE TO AVOID VIBRATION TRANSFERRENCE AND

EXPANSION INTERFERENCE, AND TO FACILITATE SYSTEM

1. REMOVE AND RE-INSTALL LAY-IN CEILINGS IN AREAS WHERE

CEILINGS ARE TO REMAIN. REPLACE DAMAGED CEILING

3. REMOVE EXISTING DRYWALL OR PLASTER CEILINGS TO

MATERIALS TO MATCH EXISTING CEILING.

ADJACENT UNDISTURBED SURFACES.

ARE INDICATED IN THE SPECIFICATIONS

CEILINGS IN OCCUPIED AREAS.

THE INSTALLATION OF ITEMS SHOWN. SEE ARCHITECTURAL

DRAWINGS FOR IDENTIFICATION OF AREAS WHERE EXISTING

2. CEILING TILES MAY BE LEFT OUT OF THE CEILING IN AREAS UNDER

OWNER SO AS NOT TO HINDER THE DAILY OPERATIONS OF THE

CONSTRUCTION ONLY IF STORED IN AREAS AS DIRECTED BY THE

ACCOMMODATE INSTALLATION OF ITEMS INDICATED. PATCH AND

PAINT DRYWALL OR PLASTER CEILINGS TO MATCH EXISTING

4. PROVIDE ESCUTCHEONS FOR ALL PIPING PENETRATIONS OF

5. FIRESTOP ALL PENETRATIONS OF RATED CEILINGS WITH THE

PLASTIC PIPE THROUGH MASONRY/ CONCRETE

PLASTIC PIPE THROUGH POURED CONCRETE FLOOR SLAB

APPROPRIATE FIRESTOPPING MATERIAL. REQUIRED MATERIALS

EXISTING CEILINGS ARE TO REMAIN AS REQUIRED TO COMPLETE

SUCH THAT DUCTWORK MAINS ARE THE HIGHEST LEVEL AND ARE

TIGHT TO BUILDING STEEL. HVAC PIPING AND PLUMBING PIPING

PLENUMS SHALL COMPLY WITH NFPA 90A REQUIREMENTS.

FACILITATE INSTALLATION OF ITEMS INDICATED.

ABBREVIATION

KILOWAT

LENGTH

POUNDS

LINEAR FOOT

MIXED AIR

MAXIMUM

MINIMUM

NORTH

LOCKED ROTOR AMPS

MAKE-UP AIR UNIT

MANUFACTURER

MULTIZONE UNIT

NOT APPLICABLE

NOISE CRITERIA

NORMALLY CLOSED

NORMALLY OPEN

NOT TO SCALE

OUTDOOR AIR

PRESSURE DROP

PREHEAT COIL

RETURN AIR

ROOF DRAIN

RETURN FAN

REHEAT COIL

ROOFTOP UNIT

RELIEF VALVE

SUPPLY AIR

SMOKE DAMPER

SQUARE FEET

SUPPLY FAN

ASSOCIATION

SPECIFICATIONS

STAINLESS STEEL

THERMOSTAT

TOP OF DUCT

TOP OF PIPE

UNIT HEATER

UP THROUGH FLOOR

UP THROUGH ROOF

UNIT VENTILATOR

VACUUM BREAKER

WATTS

WET BULB

WIRE SIZE AMPS

VARIABLE AIR VOLUME

VITREOUS CLAY TILE

VENT THROUGH ROOF

VARIABLE FREQUENCY DRIVE

VERTICAL INTEGRAL FACE AND BYPASS

VARIABLE VOLUME AND TEMPERATURE

INCHES WATER COLUMN (PRESSURE)

WATER PRESSURE DROP (FEET OF WATER COLUMN)

WATER GAUGE (PRESSURE)

TYPICAL

TRANSFER AIR

TERMINAL BOX

TEMPERATURE CONTROL

TEMPERATURE (DEG F)

TOTAL STATIC PRESSURE

T-STAT

NOMINAL PIPE THREAD

OUTDOOR AIR TEMPERATURE

PARALLEL BLADE DAMPER

PLUMBING CONTRACTOR

POUNDS PER SQUARE INCH

POLYVINYL CHLORIDE

RADIANT CEILING PANEL

RELATIVE HUMIDITY

RUNNING LOAD AMPS

SOUND ATTENUATOR

REVOLUTIONS PER MINUTE

SEASONAL ENERGY EFFICIENCY RATIO

STEAM PRESSURE REDUCING STATION

STEAM PRESSURE REDUCING VALVE

SATURATED SUCTION TEMPERATURE

(TEMPERATURE) CONTROL CONTRACTOR

(TEMPERATURE) CONTROL PANEL

UNDERWRITERS LABORATORIES UNLESS NOTED OTHERWISE

TEMPERATURE AND PRESSURE

SHEET METAL AND AIRCONDITIONING CONTRACTORS NATIONAL

NUMBER

MINIMUM FUSE SIZE

MOTOR HORSEPOWER

MOTOR OPERATED DAMPER

NATIONAL ELECTRIC CODE

MAXIMUM OVERCURRENT PROTECTION

NATIONAL FIRE PROTECTION ASSOCIATION

HYDRONIC PRESSURE REDUCING VALVE

POUNDS PER SQUARE INCH ABSOLUTE

PACKAGED TERMINAL AIR CONDITIONING UNIT

POUNDS PER SQUARE INCH GAUGE

MIXED AIR TEMPERATURE

MECHANICAL CONTRACTOR

MINIMUM CIRCUIT AMPS

LEGEND - MECHANICAL ABBREVIATION SCHEDULE1

LEAVING AIR TEMPERATURE (DEG F)

LEAVING WATER TEMPERATURE (DEG F)

THOUSAND BRITISH THERMAL UNITS PER HOUR

DESCRIPTION

LEGEND - MECHANICAL ABBREVIATION SCHEDULE1

AIR CONDITIONING

AIR CURTAIN UNIT

AIR HANDLING UNIT

ACCESS PANEL

APPROXIMATELY

BACKDRAFT DAMPER

BRAKE HORSEPOWER

CONSTANT AIR VOLUME

CUBIC FEET PER HOUR

CUBIC FEET PER MINUTE

COEFFICIENT OF PERFORMANCE

DUCTLESS AIR CONDITIONING UNIT

DOUBLE CHECK VALVE ASSEMBLY

DUCT MOUNTED SMOKE DETECTOR

ENTERING AIR TEMPERATURE (DEG F)

ELECTRICAL CABINET UNIT HEATER

ENVIRONMENTAL CONTROL UNIT

DUAL DUCT TERMINAL BOX

DIRECT DIGITAL CONTROL

DIFFERENTIAL PRESSURE

DOWN THROUGH FLOOR

DOWN THROUGH ROOF

DIRECT EXPANSION

ELECTRIC BASE BOARD

ENTERING DRY BULB

EXHAUST FAN

ELECTRIC HEATER

EXPANSION TANK

EXISTING TO REMAIN

ENTERING WET BULB

ELECTRIC UNIT HEATER

ELECTRIC WALL HEATER

ENTERING WATER TEMPERATURE (DEG F)

ET CETERA

FURNACE

FILTER

FAN COIL UNIT

FIRE DAMPER

FLOOR DRAIN

FULL LOAD AMPS

FIRE PROTECTION

FEET PER MINUTE

FLASH TANK

HUMIDIFIER

HEAT PUMP HORSEPOWER

HUMIDIFIER

HEAT EXCHANGER

INVERT ELEVATION

HOOD

HEATING COIL

GALLON

FIRE PROTECTION CONTRACTOR

FAN POWERED TERMINAL BOX

FINNED TUBE RADIATION

GENERAL CONTRACTOR

GALLONS PER MINUTE

GRAVITY VENTILATOR

HAND-OFF-AUTOMATIC

COMBINATION FIRE/SMOKE DAMPER

FEET OF WATER COLUMN PRESSURE

HIGH EFFIENCY PARTICULATE AIR

HERTZ (CYCLES PER SECOND)

INTEGRAL FACE AND BYPASS

ELECTRIC DUCT HEATER ENERGY EFFICIENCY RATIO

ENERGY RECOVERY UNIT

ENERGY RECOVERY VENTILATOR

EXTERNAL STATIC PRESSURE

ELECTRICAL CONTRACTOR

DEGREES FARENHEIT

DEMOLITION

DIAMETER

DRAWING

EXHAUST AIR

CARBON MONOXIDE

CONDENSATE PUMP

COOLING TOWER

CONDENSING UNIT

CABINET UNIT HEATER

CARBON DIOXIDE

COMPRESSOR

CONVECTOR

DEAREATOR

DRY BULB

BOTTOM OF DUCT

BOTTOM OF PIPE

COOLING COIL

CHILLER

CLEANOUT

BELOW FINISHED GRADE

BRITISH THERMAL UNIT PER HOUR

BOILER

AIR COOLED CONDENSER

AIR COMPRESSOR DRYER

ABOVE FINISHED FLOOR

ABOVE FINISHED GRADE

AIRFLOW MEASURING STATION

ARCHITECT, ARCHITECTURAL

ANNUAL FUEL UTILIZATION EFFICIENCY

AIR PRESSURE DROP (INCHES OF WATER COLUMN)

DESCRIPTION

ABBREVIATION

RELEASED FOR

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ARCHITECTURE, LLC 740 MARKS ROAD - SUITE A, VALLEY CITY, OHIO 44208

PROJECT:

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ENANT

201 LE

1. EXISTING LINETYPE: THIN (LIGHT) SOLID LINES REPRESENT ITEMS THAT ARE EXISTING TO REMAIN OR ARE FURNISHED BY OTHERS.

SHEET NOTES

3. NEW LINETYPE: THICK (DARK) SOLID LINES REPRESENT ITEMS THAT ARE NEW OR RELOCATED.

4. RELEVANT EXISTING CONDITIONS SHOWN ARE BASED ON RECORD DRAWINGS AND FIELD OBSERVATION(S). NOT ALL EXISTING ITEMS ARE SHOWN, OR COULD BE FIELD VERIFIED. ONCE AREAS OBSCURED FROM VIEW ARE EXPOSED, VERIFY THAT CONDITIONS ARE AS INDICATED ON THIS DRAWING. BEFORE PROCEEDING WITH WORK, NOTIFY THE ENGINEER IF CONDITIONS DIFFER FROM WHAT IS SHOWN.

5. EQUIPMENT SHOWN GRAY-SHADED OR TAGGED HAVE AN 6. EQUIPMENT AND ITEMS TO BE RELOCATED ARE IDENTIFIED ON

DRAWING LIST - MECHANICAL SHEET NUMBER SHEET NAME GENERAL INFORMATION FIRST FLOOR MECHANICAL DEMOLITION PLAN FIRST FLOOR MECHANICAL PLAN FIRST FLOOR ENLARGED MECHANICAL PLANS MECHANICAL SCHEDULES AND DETAILS MECHANICAL SPECIFICATIONS MECHANICAL SPECIFICATIONS

REFERENCE SYMBOLS

X VIEW NUMBER ON SHEET SHEET REFERENCE	DETAIL CALLOUT
X X VIEW NUMBER ON SHEET REFERENCE	SECTION AND ELEVATION CALLOUT
X VIEW NUMBER ON SHEET XXXXX SHEET REFERENCE	ENLARGED PLAN CALLOUT
VIEW NUMBER ON SHEET SHEET REFERENCE	CONTINUATION CALLOUT

275 Springside Dr., Suite 300 Akron, Ohio 44333 Phone: 330-666-3702 ptaengineering.com

DRAWING INTERPRETATION NOTES:

2. DEMOLITION LINETYPE: THICK (DARK) DASHED LINES REPRESENT EXISTING ITEMS TO BE REMOVED.

ASSOCIATED EQUIPMENT SCHEDULE. SEE SCHEDULE SHEET(S).

THE PLANS AND/OR EQUIPMENT SCHEDULE(S).

	DUCT LINETYPE SCHED	ULE
ABBREVIATION	DESCRIPTION	MATERIAL
CA	COMBUSTION AIR	GALVANIZED
EA	EXHAUST AIR	GALVANIZED
FLUE	FUEL-BURNING APPLIANCE FLUE VENT	TYPE B DOUBLE WALL
OA	OUTDOOR AIR	GALVANIZED
RA	RETURN AIR	GALVANIZED
SA	SUPPLY AIR	GALVANIZED
TA	TRANSFER AIR	GALVANIZED

SLAB ON GRADE FLOOR PENETRATION NOTES: 1. CUT AND PATCH EXISTING FLOOR SLAB TO FACILITATE INSTALLATION OF UNDERFLOOR ITEMS INDICATED.

2. PATCH WITH MATERIALS SUITABLE FOR THE APPLICATION AND OF EQUAL STRENGTH AND THICKNESS AS ADJACENT UNDISTURBED SURFACES.

3. CUTTING AND PATCHING OF EXISTING FLOOR SLABS SHALL BE PROVIDED BY THE CONTRACTOR REQUIRING THE WORK. COORDINATE LOCATIONS AND AREAS OF SLAB REMOVAL WITH OTHERS TO FACILITATE INSTALLATION OF UNDERFLOOR ITEMS INDICATED.

ROOF PENETRATION NOTES: 1. CUT AND PATCH THE EXISTING ROOF AS REQUIRED TO FACILITATE

INSTALLATION OF ROOF MOUNTED EQUIPMENT, SUPPORTS, AND PENETRATIONS INDICATED. 2. THE EXISTING ROOF IS UNDER WARRANTY, ALL ROOF WORK

SHALL BE PERFORMED IN SUCH A MANNER AS TO MAINTAIN THE VALIDITY OF THE CURRENT WARRANTY. 3. CUTTING AND PATCHING OF EXISTING ROOF SHALL BE PROVIDED BY THE CONTRACTOR REQUIRING THE WORK.

COORDINATE LOCATIONS AND AREAS OF ROOFING SYSTEM

MOUNTED ITEMS INDICATED. 4. ROOF PENETRATIONS SHALL BE MADE IN ACCORDANCE WITH ARCHITECT/STRUCTURAL ENGINEER'S DESIGN REQUIREMENTS.

REMOVAL WITH OTHERS TO FACILITATE INSTALLATION OF ROOF

5. OBTAIN APPROVAL OF LOCATION AND PENETRATION METHOD PRIOR TO CREATING ROOF PENETRATIONS.

INTERIOR WALL PENETRATION NOTES:

FACILITATE INSTALLATION OF ITEMS INDICATED. 2. PATCH AND PAINT EXISTING WALLS TO MATCH ADJACENT UNDISTURBED SURFACES.

1. PENETRATE INTERIOR BUILDING WALLS AS REQUIRED TO

3. FIRESTOP PENETRATIONS OF RATED WALLS WITH APPRORIATE SPECIFIED FIREPROOFING MATERIAL AND SEALING METHODS. 4. SOUND STOP FULL HEIGHT WALLS WITH APPROPRIATE MATERIALS

SECTION OF THE SPECIFICATIONS. 5. MAKE WALL PENETRATIONS LARGE ENOUGH TO ALLOW INSULATED PIPES AND/OR DUCTS TO PASS THROUGH WITHOUT INTERRUPTION

AND METHODS AND AS INDICATED IN THE "PENETRATIONS"

OF INSULATION. 6. ALLOW A MINIMUM 3" CLEARANCE AROUND ALL SIDES BETWEEN

DUCT SURFACE AND ANY WALL STUDS OR HEADERS TO AVOID TRANSFERRENCE OF VIBRATION TO STRUCTURE.

3 HOUR HILTI UL #CAJ2109 OR #CAJ2110 OR APPROVED EQUAL

3 HOUR HILTI UL #FA2054 OR APPROVED EQUAL

	HVAC PIPF AND F	ITTING SCHEDULE		
* WHERE MORE THAN ONE TYPE OF MA	-		ALLER'S CHOICE.	
CEDVICE	CITE	DIDE MATERIAL	FITTINGS	JOINTS
SERVICE	SIZE	PIPE MATERIAL	FITTINGS	JOINTS
REFRIGERANT PIPING	ALL SIZES	TYPE L HARD COPPER	WROUGHT COPPER	BRAZED

NOTES	5:		
1.	FIRESTOP ASSEMBLY TYPE (REQUIRED FIRESTOPPING MATERIAND PENETRATION TYPE AND SHALL BE UL LISTED AND TESTE SHALL BE EQUIVALENT TO THE WALL OR FLOOR/CEILING ASSE	D IN ACCORDAN	
2.	ACCEPTABLE FIRE BARRIER PRODUCTS: HILTI "FS-ONE", NELS	SON "FLAMESEAL"	" OR APPROVED EQUAL AS MANUFACTURED BY 3M.
3.	IF REQUESTED, THECONTRACTOR SHALL SHOW PROOF OF COLUMBER TO THE INSPECTION AUTHORITY HAVING JURISDICTION		
	PENETRATION	RATING	U.L. SYSTEM
METAL	DUCT WITHOUT FIRE DAMPER THROUGH GYPSUM BOARD	1 OR 2 HOUR	HILTI UL #WL7040 OR #WL7042 OR APPROVED EQUAL
METAL	DUCT WITHOUT FIRE DAMPER THROUGH MASONRY/CONCRETE	1 OR 2 HOUR	HILTI UL #WJ7021 OR #WJ7022 OR APPROVED EQUAL
METAL	DUCT WITHOUT FIRE DAMPER THROUGH MASONRY/CONCRETE	3 HOUR	HILTI UL #CAJ7046 OR APPROVED EQUAL
METAL	_ PIPE THROUGH GYPSUM BOARD	1 OR 2 HOUR	HILTI UL #WL1054 OR APPROVED EQUAL
METAL	_ PIPE THROUGH MASONRY/CONCRETE	2 HOUR	HILTI UL #CAJ1291 OR APPROVED EQUAL
METAL	_ PIPE THROUGH MASONRY/CONCRETE	3 HOUR	HILTI UL #CAJ1155 OR #CAJ1226 OR APPROVED EQUAL
METAL	PIPE THROUGH POURED CONCRETE FLOOR SLAB	3 HOUR	HILTI UL #FA1017 OR APPROVED EQUAL
INSUL	ATED METAL PIPE THROUGH GYPSUM BOARD	1 OR 2 HOUR	HILTI UL #WL5029 OR APPROVED EQUAL
INSUL	ATED METAL PIPE THROUGHMASONRY/CONCRETE	2 HOUR	HILTI UL #CAJ5091 OR APPROVED EQUAL
INSUL	ATED METAL PIPE THROUGH MASONRY	4 HOUR	HILTI UL #WJ5028 OR APPROVED EQUAL
INSUL	ATED METAL PIPE THROUGH POURED CONCRETE FLOOR SLAB	2 HOUR	HILTI UL #FA5017 OR APPROVED EQUAL
PLAST	IC PIPE THROUGH GYPSUM BOARD	1 OR 2 HOUR	HILTI UL #WL2078 OR APPROVED EQUAL
PLAST	TC PIPE THROUGH MASONRY/CONCRETE	2 HOUR	HILTI UL #CAJ2271 OR APPROVED EQUAL

FIRESTOP SCHEDULE

INSULATI	ON TYPE DESCRIPTIONS			
FD	FLEXIBLE DUCT WRAP INSULATION; MINIMUN DERATED VALVE OF R = 6.0 AT 70 DEG. F. MIDENSITY = 0.75 POUNDS PER CUBIC FOOT.			
EP	FLEXIBLE UNICELLULAR, PREFORMED ELASTO CONDUCTIVITY K = 0.28 AT 70 DEG. MEAN T			IUM THERI
EF	FLEXIBLE, CLOSED-CELL, CFC-FREE, FACTOR' INSULATION; THERMAL CONDUCTIVITY K = 0 VAPOR TRANSMISSION = 0.08 PERM-INCH, U	.30 AT 70 DE	G. MEAN TEMPERAT	URE; WAT
INSULATI	ON FINISH DESCRIPTIONS			
FFV	FOIL FACED KRAFT PAPER VAPOR SEAL, FACT	ORY APPLIED		
FFV	FOIL FACED KRAFT PAPER VAPOR SEAL, FACT	ORY APPLIED		
FFV	FOIL FACED KRAFT PAPER VAPOR SEAL, FACT SERVICE	ORY APPLIED TYPE	THICKNESS	FINIS
	SERVICE	ТҮРЕ		
COMBUST	SERVICE ION AND OUTSIDE AIR DUCTWORK		3"	FINIS FFV FFV
COMBUST SUPPLY, N	SERVICE	TYPE FD		FFV FFV
COMBUST SUPPLY, N SUPPLY, R NON-AIR	SERVICE ION AND OUTSIDE AIR DUCTWORK IIXED AND RELIEF AIR DUCTWORK ETURN, MIXED AND RELIEF AIR DUCTWORK (IN	TYPE FD FD	3"	FFV

MARK: ISSUE: **ISSUED**

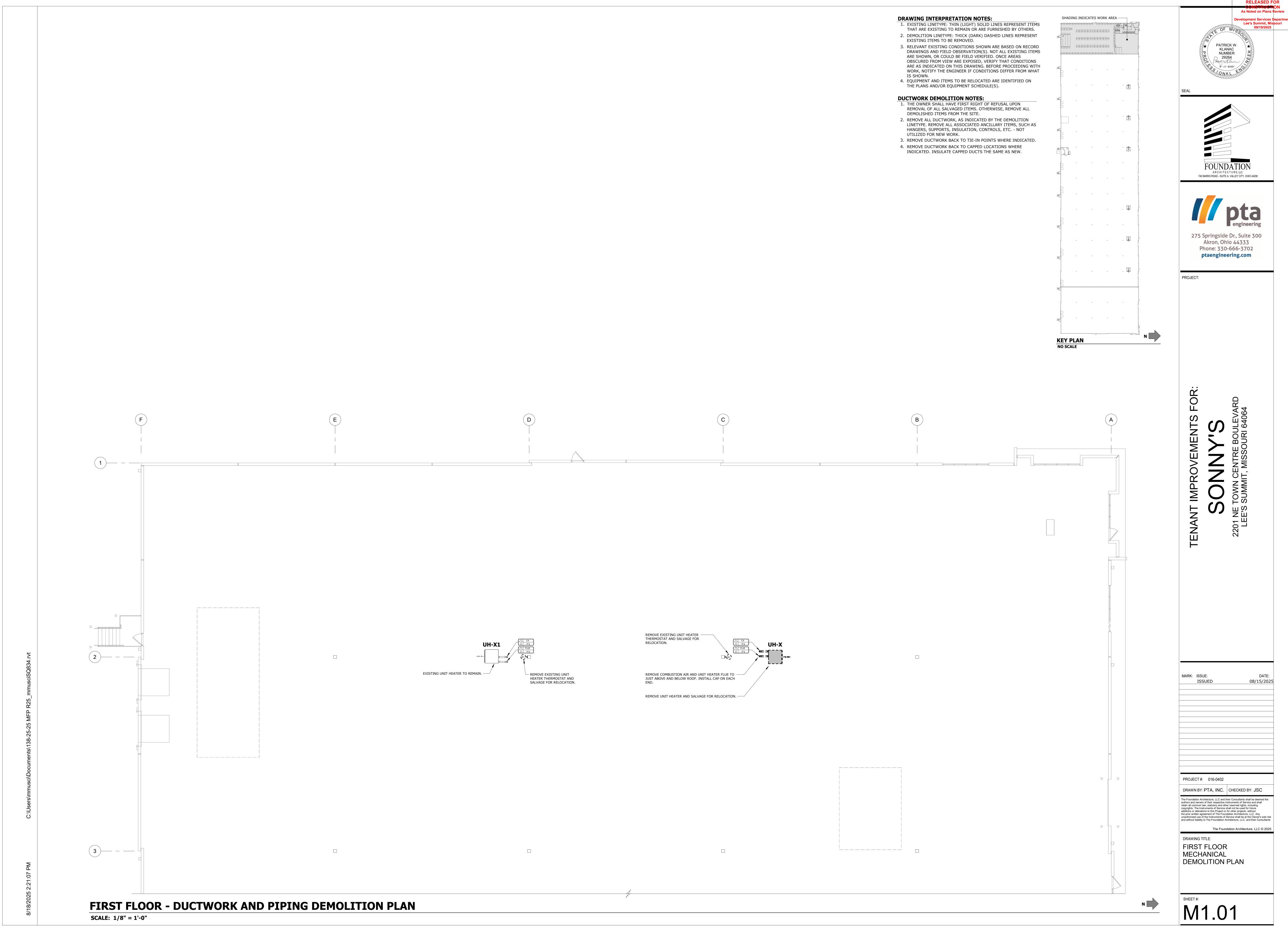
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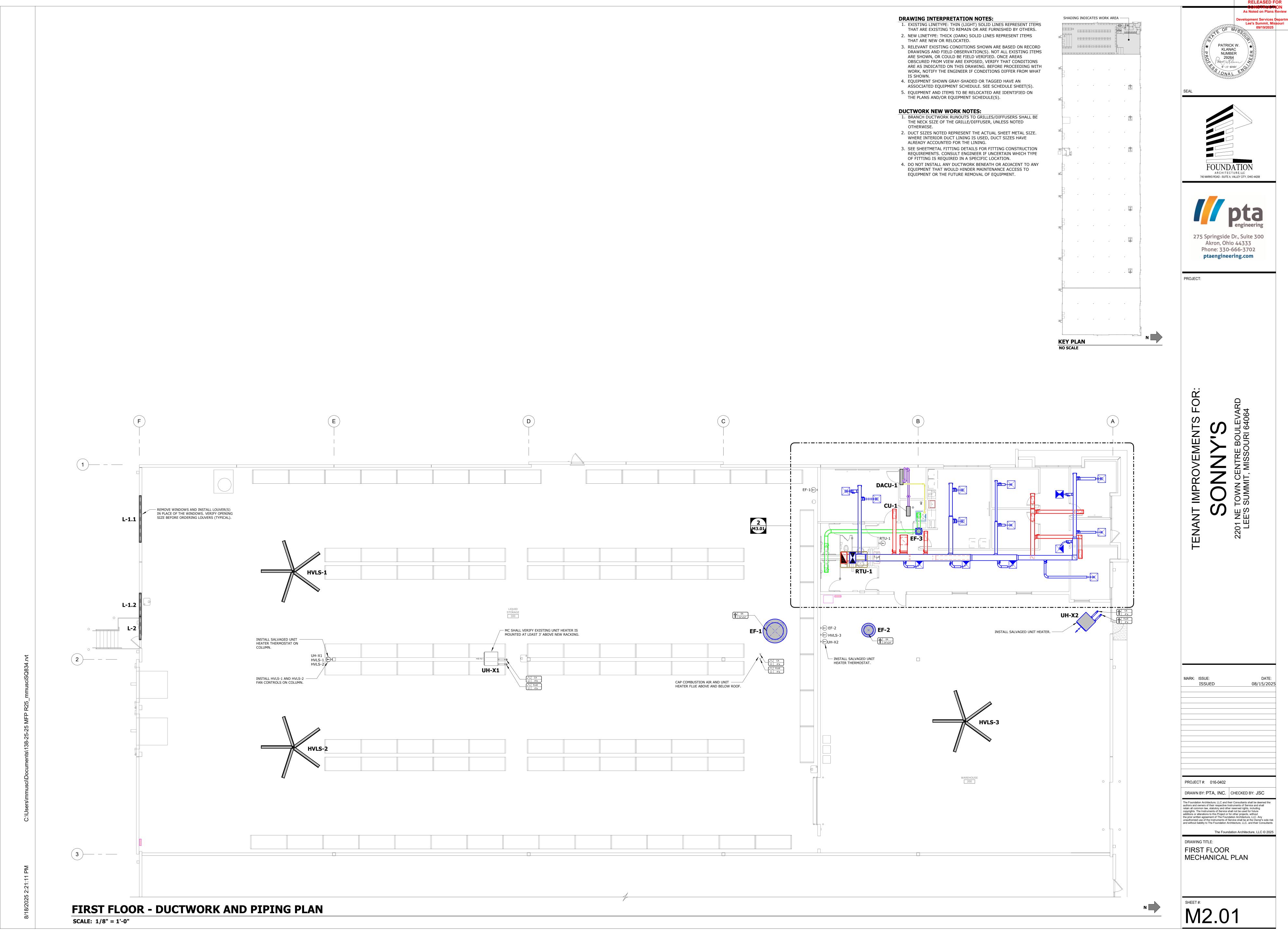
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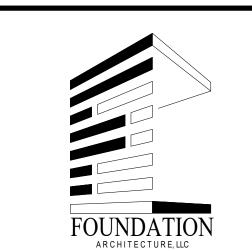
Development Services Departm Lee's Summit, Missouri 09/19/2025



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Lee's Summit, Missouri





DRAWING INTERPRETATION NOTES: 1. EXISTING LINETYPE: THIN (LIGHT) SOLID LINES REPRESENT ITEMS

THAT ARE EXISTING TO REMAIN OR ARE FURNISHED BY OTHERS. 2. RELEVANT EXISTING CONDITIONS SHOWN ARE BASED ON RECORD DRAWINGS AND FIELD OBSERVATION(S). NOT ALL EXISTING ITEMS ARE SHOWN, OR COULD BE FIELD VERIFIED. ONCE AREAS OBSCURED FROM VIEW ARE EXPOSED, VERIFY THAT CONDITIONS ARE AS INDICATED ON THIS DRAWING. BEFORE PROCEEDING WITH WORK, NOTIFY THE ENGINEER IF CONDITIONS DIFFER FROM WHAT

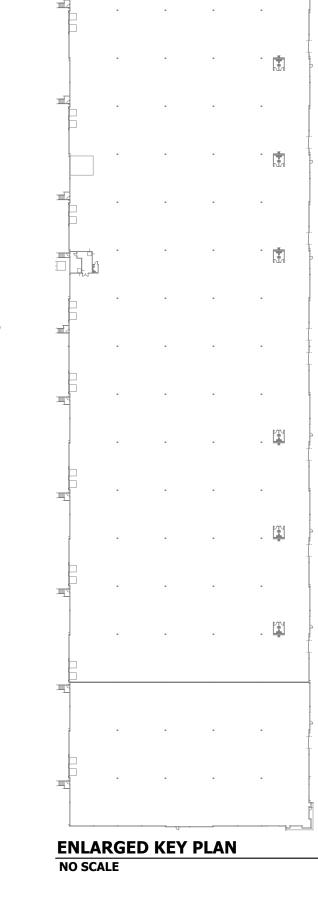
3. EQUIPMENT SHOWN GRAY-SHADED OR TAGGED HAVE AN ASSOCIATED EQUIPMENT SCHEDULE. SEE SCHEDULE SHEET(S).

DUCTWORK NEW WORK NOTES:

- 1. BRANCH DUCTWORK RUNOUTS TO GRILLES/DIFFUSERS SHALL BE THE NECK SIZE OF THE GRILLE/DIFFUSER, UNLESS NOTED OTHERWISE.
- 2. DUCT SIZES NOTED REPRESENT THE ACTUAL SHEET METAL SIZE. WHERE INTERIOR DUCT LINING IS USED, DUCT SIZES HAVE ALREADY ACCOUNTED FOR THE LINING.
- 3. SEE SHEETMETAL FITTING DETAILS FOR FITTING CONSTRUCTION REQUIREMENTS. CONSULT ENGINEER IF UNCERTAIN WHICH TYPE
- OF FITTING IS REQUIRED IN A SPECIFIC LOCATION. 4. DO NOT INSTALL ANY DUCTWORK BENEATH OR ADJACENT TO ANY EQUIPMENT THAT WOULD HINDER MAINTENANCE ACCESS TO

EQUIPMENT OR THE FUTURE REMOVAL OF EQUIPMENT.

REFRIGERANT SYSTEM NEW WORK NOTES: 1. CONSULT WITH EQUIPMENT MANUFACTURER FOR FINAL REQUIRED PIPE SIZES. ANY SIZES SHOWN ON THESE DOCUMENTS SHALL BE CONSIDERED APPROXIMATE, FOR PRICING PURPOSES ONLY.



SHADING INDICATES WORK AREA ——

CU-1 LOCATED ON ROOF ABOVE. PROVIDE ROOF ——RAILS AND PIPE CURB WITH INSTALLATION.
MOUNT AT LEAST 10' FROM EDGE OF ROOF. — PIPE CURB ON ROOF. TERMINATE
CONDENSATE
DRAIN IN MOP
BASIN WITH
AIR GAP. 10"x8" RA 10"x8" RA INSTALL RTU-1 ON ROOF ABOVE. INSTALL MANUAL BALANCE DAMPER ON DUCT RUN TO EXHAUST GRILLE (TYPICAL).

2 FIRST FLOOR - ENLARGED DUCTWORK AND PIPING PLAN
M2.01 1/4" = 1'-0"

PATRICK W. \★ KLANAC NUMBER 29264

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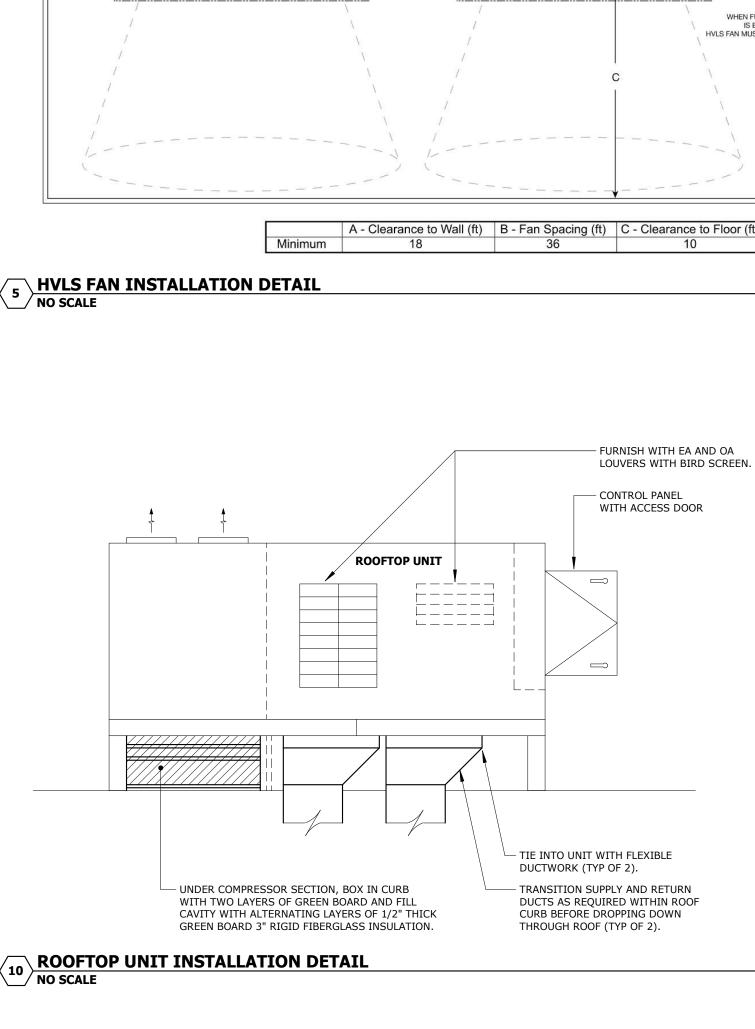
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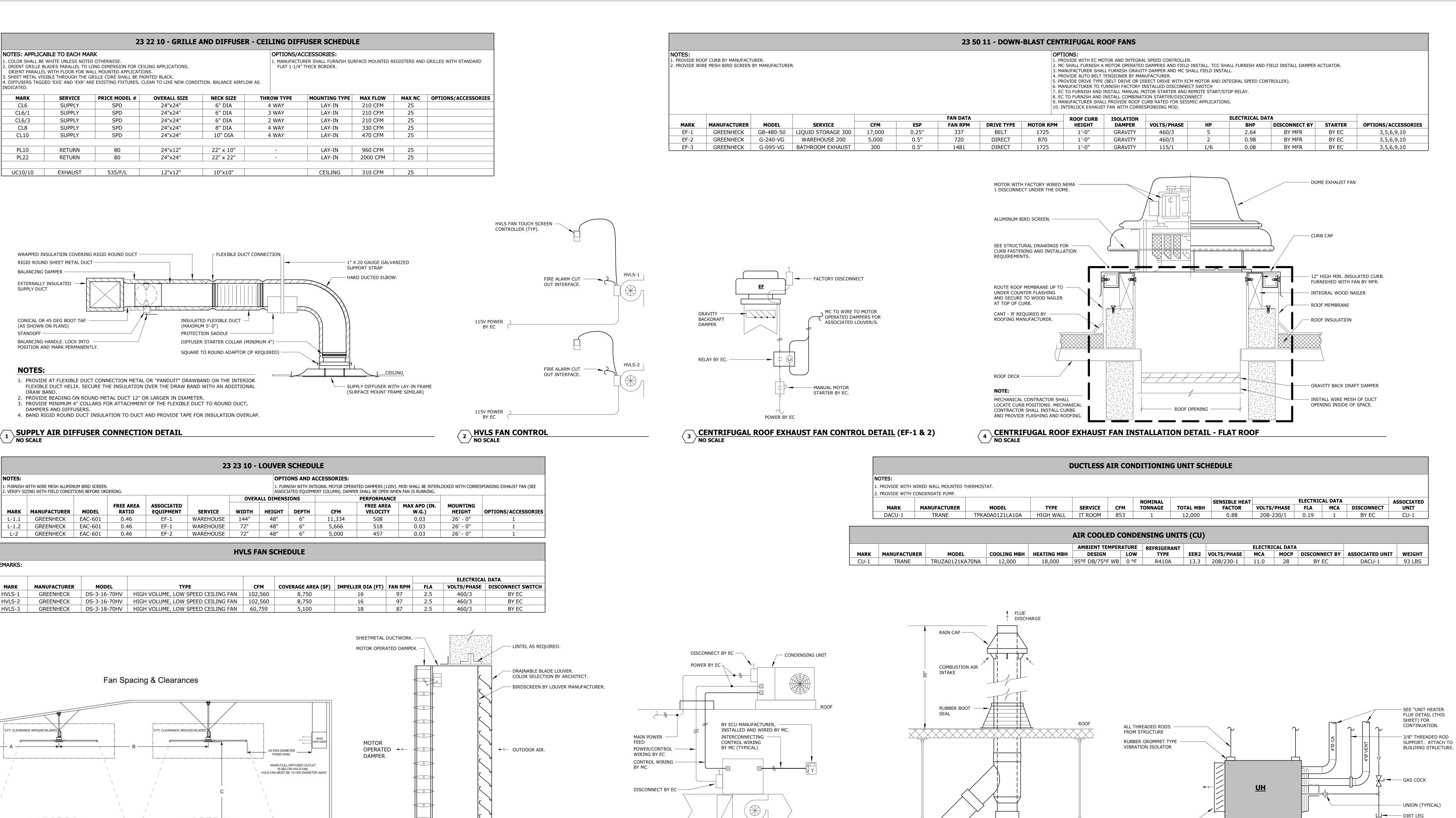
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DRAWING TITLE: FIRST FLOOR ENLARGED MECHANICAL PLANS

M3.01





ENVIRONMENTAL CONTROL

UNIT (ECU)

OA% 12

7 DACU CONTROL DIAGRAM - STAND ALONE NO SCALE

INTAKE/ COMBUSTION AIR —

8 UNIT HEATER FLUE DETAIL NO SCALE



FLASHING.

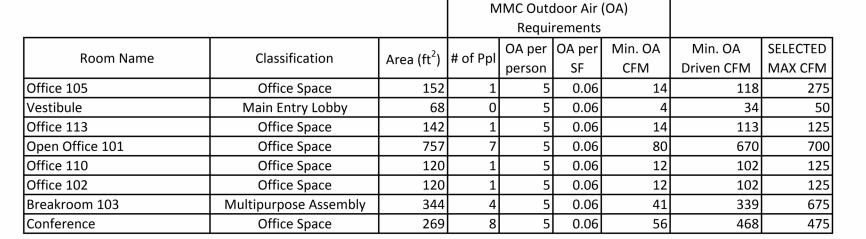
ANGLE IRON -

AROUND ENTIRE

6 LOUVER INSTALLATION DETAIL
NO SCALE

- ANCHOR LOUVER AND SEAL LOUVER

PERIMETER PER MANUFACTURER'S



					23 60	10 - PACKAGI	ED KIU SCHE	DULE (PART 1	.)				
NOTES:							OPTIONS/ACCE	SSORIES:					
1. PROVIDE WITH	THROUGH THE BASE ELEC	TRIC.					1. PROVIDE WITH PRO	OGRAMMABLE THERMOST	TAT.				
2. PROVIDE WITH	NON-FUSED DISCONNECT.						2. PROVIDE WITH POWERED GFCI, 120V15A, 2 PLUG, CONVENIENCE OUTLET WITH A SERVICE RECEPTABLE DISCONNECT.						
3. PROVIDE WITH	2" MERV 8 FILTERS.						3. PROVIDE WITH ECO	ONOMIZER WITH BAROM	ETRIC RELIEF.				
							4. PROVIDE WITH MO	DULATING HOT GAS REH	EAT.				
		GENEI	RAL					S	UPPLY FAN DATA				
			UNIT A	IRFLOW									
MARK	MANUFACTURER	MODEL	SUPPLY	OA	WEIGHT	ESP	TSP	FAN TYPE	FAN RPM	DRIVE	ВНР	МНР	OPTIONS/ACCESSORIES
RTU-1	TRANE	YSK072A4S0L	2600	312	1480 LBS	0.750 IN WC	1.015 IN WC	BC PLENUM	1112	DIRECT	0.939	3	1,2,3,4

HORIZONTAL AND VERTICAL -LOUVERS, FURNISHED BY MANUFACTURERS.

1. INSTALL PER MANUFACTURER'S PUBLISHED

9 GAS-FIRED UNIT HEATER DETAIL
NO SCALE

RECOMMENDED CLEARANCES FOR ALL CONNECTIONS,

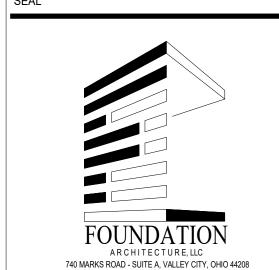
- VENT EXHAUST

									23 60	10 - PACKA	GED RTU SC	HEDULE (PA	ART 2)									
NOTES:											OPTIONS/ACCE	SSORIES:										
1.											1.											
						DIRECT EXP	ANSION COOLIN	G COIL DATA							GAS	HEAT		FIL	TER	EL	ECTRICAL DATA	
			ENTER]	ING AIR	LEAVII	NG AIR		QTY. OF		COMPR	RESSOR	EFFICIE	NCY DATA									
MARK	TOTAL MBH	SENSIBLE MBH	DRY BULB	WET BULB	DRY BULB	WET BULB	STAGES OF COOLING	REFRIGERANT CIRCUITS	REFRIGERANT TYPE	QUANTITY	TYPE	EER	IEER/SEER	EAT	LAT	MAX INPUT (MBH)	MAX OUTPUT (MBH)	EFFICIENCY	THICKNESS	VOLTS/PHASE	MCA	МОСР
RTU-1	80.66	66.01	81.24 °F	66.43 °F	57.49 °F	56.41 °F	3	1	R-454B	2	SCROLL	11.0	14.6	52.32 °F	75.10 °F	80.0	64.80	MERV 8	2"	460/3	20	25

PATRICK W. NUMBER 29264

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DRAWING TITLE: **MECHANICAL** SCHEDULES AND DETAILS

M4.01

ILL GOVERNING STATE AND LOCAL CODE REQUIREMENTS, IN FULL CONFORMITY WITH THE BEST CURRENT

<u>HVAC</u>

TRADE PRACTICES AND SUBJECT TO APPROVAL OF THE ARCHITECT/ENGINEER OR HIS REPRESENTATIVE. C. ALL WORK DETAILS NOT COVERED IN THESE SPECIFICATIONS SHALL BE GOVERNED BY THE REQUIREMENTS OF THE LATEST EDITION OF THE MISSOURI MECHANICAL CODE AND NFPA-99.

D. INSTALLER SHALL BE LICENSED BY THE STATE OF MISSOURI AS A MECHANICAL CONTRACTOR. E. WORK INCLUDED UNDER THIS DIVISION SHALL CONSIST OF FURNISHING ALL MATERIALS, SUPPLIES, EQUIPMENT, TOOLS, TRANSPORTATION, FACILITIES AND PERFORMING ALL LABOR AND SERVICES NECESSARY FOR THE COMPLETE INSTALLATION OF THE HVAC SYSTEMS SHOWN.

F. THIS CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK TO BE DONE UNDER OTHER DIVISIONS OF THIS SPECIFICATION AND THEIR RELATED DRAWINGS AND SHALL SO COORDINATE AND SCHEDULE HIS WORK AS NOT TO CAUSE DELAYS OR INTERFERENCE WITH THE WORK OF OTHERS

G. ALL ITEMS OF LABOR, MATERIAL AND EQUIPMENT NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON PLANS, BUT INCIDENTAL TO, OR REQUIRED FOR THE COMPLETE INSTALLATION AND PROPER OPERATION OF THE WORK, SHALL BE FURNISHED AS IF CALLED FOR IN DETAIL BY THE SPECIFICATIONS OR

H. THE DESIGN DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT, AND LOCATIONS OF EQUIPMENT, DUCTWORK AND PIPING. VERIFY DIMENSIONS IN THE FIELD; ADJUST TO MANUFACTURER'S SHOP DRAWINGS. DO NOT SCALE DRAWINGS. PIPING, DUCTWORK, AND EQUIPMENT ARE TO BE INSTALLED ALONG THE GENERAL PLANS SHOWN ON THE DRAWINGS, BUT KEEPING IN MIND ACTUAL BUILDING CONDITIONS WHICH MUST BE CONFORMED WITHIN THE ACTUAL WORK.

I. DETERMINE SIZES AND LOCATIONS FOR CHASES AND OPENINGS NECESSARY FOR INSTALLATION OF THE WORK. COOPERATE WITH OTHER TRADES IN SETTING SLEEVES, INSERTS AND HANGERS. J. ALL EOUIPMENT AND MATERIALS SHALL BE NEW AND SHALL CONFORM TO UNDERWRITERS' LABORATORIES TANDARDS, WHERE APPLICABLE. WHERE SPECIFICATIONS DESCRIBE, OR PLANS SHOW, MATERIALS OR

K. COOPERATE WITH ALL TRADES IN PREPARING INTERFERENCE DRAWINGS FOR LOCATIONS WHERE THERE IS POSSIBLE CONFLICT BETWEEN TRADES. EXACT LOCATION OF PIPES, DUCTS, AND CONDUIT BASED ON FIELD MEASUREMENTS WITH FINAL ARRANGEMENT DETERMINED BY INTRA-TRADE AGREEMENTS SUBJECT

SPECIFICATIONS SHALL GOVERN THE QUALITY OF THE MATERIAL OR EQUIPMENT.

TO ARCHITECT/ENGINEER'S APPROVAL. L. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER BY FIRST-CLASS MECHANICS.

EQUIPMENT OF HIGHER QUALITY THAN REQUIRED BY CODE AND LOCAL RULING, THE DRAWINGS AND

THE CONTRACTOR SHALL PROVIDE ADEQUATE AND COMPETENT SUPERVISION OF THE JOB AS REQUIRED M. DUCTWORK, PIPING, AND EQUIPMENT SHALL BE ARRANGED SUBSTANTIALLY AS INDICATED. ANY CHANGES RESULTING IN A SAVINGS IN LABOR OR MATERIAL SHALL BE MADE ONLY IN ACCORDANCE WITH A CONTRACT CHANGE ORDER. DEVIATIONS SHALL BE MADE ONLY WHERE NECESSARY TO AVOID INTERFERENCES AND ONLY AFTER DRAWINGS SHOWING THE PROPOSED DEVIATIONS HAVE BEEN

SUBMITTED TO AND APPROVED BY THE ARCHITECT/ENGINEER. N. THE ARCHITECT AND ENGINEER RESERVE THE RIGHT TO MAKE REASONABLE CHANGES WITHOUT EXTRA COST TO THE OWNER.

O. COORDINATE ALL SYSTEM SHUT-DOWNS WITH THE OWNER.

P. GENERAL SCOPE OF WORK: (1) THE MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT AS SHOWN ON THE DRAWINGS INCLUDING PIPING, DUCTWORK, INSULATION, AND CONTROLS.

(2) EACH CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION WORK SHOWN ON THE DRAWINGS. DEMOLITION WORK SHALL INCLUDE REMOVAL, CUTTING AND PATCHING, SALVAGE, AND LEGAL DISPOSAL AS APPLICABLE TO THE PROJECT

(1) FACH CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE WORK. THE SUBMISSION OF A PROPOSAL SHALL PRESUPPOSE KNOWLEDGE OF ALL SUCH CONDITIONS

R. PROTECTION OF WORK AND PROPERTY (1) EACH CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING WORK, PROPERTY AND FACILITIES AGAINST DAMAGE, BOTH HIS OWN AS WELL AS OTHERS, WITH WHICH HE MAY COME INTO CONTACT

(2) STORED MATERIALS SHALL BE PROTECTED AGAINST DAMAGE FROM WEATHER. PIPE OPENINGS SHALL BE CLOSED WITH CAPS OR PLUGS DURING INSTALLATION. ALL FOUIPMENT SHALL BE COVERED AND PROTECTED AGAINST INJURY. ANY MATERIALS OR FOUIPMENT DAMAGED AT ANY STAGE IN THE CONSTRUCTION SHALL BE REPLACED OR REPAIRED AND AT THE FINAL COMPLETION, ALL WORK SHALL BE IN A CLEAN, UNBLEMISHED CONDITION. (3) EACH CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FROM DIRT, FUMES, AND WATER

DURING CONSTRUCTION. PROTECTION METHODS ARE SUBJECT TO APPROVAL BY THE ARCHITECT. S. MATERIAL STORAGE:

(1) EACH CONTRACTOR SHALL MAKE PROVISIONS FOR THE DELIVERY AND SAFE STORAGE OF HIS MATERIALS AND FOUIPMENT IN COORDINATION WITH THE WORK OF OTHERS AND AS DIRECTED BY THE ARCHITECT AND OWNER. MATERIALS AND FOUIPMENT SHALL BE DELIVERED AT SUCH STAGES OF THE WORK AS WILL EXPEDITE THE WORK AS A WHOLE AND SHALL BE MARKED AND STORED IN SUCH A WAY AS TO BE EASILY CHECKED AND INSPECTED.

(1) THIS CONTRACTOR SHALL GUARANTEE FOR A PERIOD OF ONE YEAR THAT ALL WORK AND EQUIPMENT WILL REMAIN FREE FROM ALL DEFECTS IN WORKMANSHIP AND MATERIALS, AND THAT IT WIL COMPLY WITH ALL THE SPECIFIC REQUIREMENTS OF THE SPECIFICATIONS AND OTHER CONTRACT

(2) ALL WORK FOUND BY THE ARCHITECT/ENGINEER TO BE DEFECTIVE WILL BE REPLACED WITH NEW WORK MEETING ALL THE REOUIREMENTS OF THE CONTRACT. THIS CONTRACTOR WILL BEAR ALL COSTS OF SUPPLYING SUCH NEW WORK, AND INSTALLING AND FINISHING SAME, AND WILL ASSUME ALL COSTS FOR REPLACING OTHER WORK DAMAGED BY THE REMOVAL AND REPLACEMENT OF ANY OF THE WORK. THIS CONTRACTOR WILL BEAR ALL COSTS FOR FREIGHT, DRAYAGE AND DEMURRAGE. AND ALL LABOR IN CONNECTION THEREWITH

(1) BIDDERS DESIRING TO MAKE A SUBSTITUTION FOR AN ALTERNATIVE EQUIPMENT MANUFACTURER MATERIAL OR INSTALLATION METHOD NOT LISTED IN THE SPECIFICATIONS SHALL SUBMIT A WRITTEN REQUEST FOR A SUBSTITUTION TO THE ARCHITECT A MINIMUM OF FIVE WORKING DAYS PRIOR TO THE BID DUE DATE. THE SUBSTITUTION PROPOSAL SHALL INCLUDE THE FOLLOWING (2) PROPOSED SUBSTITUTION STATEMENT NAMING THE ALTERNATIVE MANUFACTURER, MATERIAL OR

(3) ALONG WITH EACH PROPOSAL, EACH EQUIPMENT SUPPLIER SHALL SUBMIT AN EQUIPMENT OR MATERIALS INFORMATION BINDER FOR REVIEW. EACH BINDER SHALL CONTAIN DETAILED EQUIPMENT INFORMATION, MATERIALS AND SPECIFICATIONS FOR EACH PIECE OF EQUIPMENT OR MATERIALS

(4) ALONG WITH EACH PROPOSAL, THE CONTRACTOR SHALL PROVIDE MODIFIED DRAWINGS SHOWING

THE INSTALLATION OF THE PROPOSED EQUIPMENT. (5) ALONG WITH EACH PROPOSAL, EACH EOUIPMENT SUPPLIER SHALL SUBMIT A COMPLIANCE REVIEW RESPONSE TO THE AFFECTED CONTRACT DOCUMENT SPECIFICATIONS. THE REVIEW SHALL BE PARAGRAPH BY PARAGRAPH DESIGNATING IN THE FRONT OF EACH PARAGRAPH-SPECIFICATION COMPLIANCE WITH A "C". DEVIATION WITH A "D". OR EXCEPTION WITH AN "E". THE REASON FOR EACH PROPOSED DEVIATION AND EXCEPTION SHALL BE GIVEN ALONG WITH SUFFICIENT DETAIL TO CLEARLY EXPLAIN/SHOW ALL DEVIATIONS AND EXCEPTIONS. KEY DEVIATION OR EXCEPTION

(A) THE EFFECT ON PERFORMANCE OVER THE ENTIRE RANGE OF EQUIPMENT OR SYSTEM OPERATION, INCLUDING THE EFFECT ON SYSTEM EFFICIENCIES. (B) THE EFFECT ON THE WORK OF OTHER TRADES CAUSED BY THE PROPOSED SUBSTITUTION.

(6) ACCEPTANCE OR REJECTION OF THE PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO APPROVAL BY THE ARCHITECT, ENGINEER OR OWNER. 23 00 20 CODES, STANDARDS, AND REGULATORY REQUIREMENTS

A. INSTALL WORK IN FULL ACCORDANCE WITH RULES AND REGULATIONS OF STATE, COUNTY AND CITY AUTHORITIES HAVING JURISDICTION OVER PREMISES. THIS SHALL INCLUDE SAFETY REQUIREMENTS OF

B. THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION REQUIRED FOR THIS WORK. C. DELIVER ALL CERTIFICATES AND OFFICIAL RECORDS OF APPROVAL, BY GOVERNING AGENCIES, TO THE

D. INSTALL WORK IN FULL ACCORDANCE WITH RULES AND REGULATIONS OF STATE, COUNTY AND CITY AUTHORITIES HAVING JURISDICTION OVER PREMISES. THIS SHALL INCLUDE SAFETY REQUIREMENTS OF

E. REFERENCE TO THE CODES AND STANDARDS LISTED SHALL CONSTITUTE THE MINIMUM ACCEPTABLE REOUIREMENTS. NOTHING IN THE SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT DEVIATION FROM THE REOUIREMENTS OF THE GOVERNING CODE. WHERE REOUIREMENTS OF THE DRAWINGS AND

SPECIFICATIONS EXCEED THOSE OF THE CODE LISTED, FOLLOW THE DRAWINGS AND SPECIFICATIONS. F. ALL WIRING SHALL BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE APPLICABLE STATE CODE, APPLICABLE LOCAL (CITY) CODE, AND OSHA. IN CASES OF CONFLICT BETWEEN

CODE AND SPECIFICATIONS, THE MORE RESTRICTIVE REQUIREMENTS SHALL GOVERN. G. ALL EQUIPMENT, MATERIALS AND INSTALLATION METHODS SHALL COMPLY WITH THE FOLLOWING CODES,

(1) BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL (BOCA)

(2) CODES AND STANDARDS ASSOCIATION (CSA) (3) INTERNATIONAL BUILDING CODE (IBC)

WHERE APPLICABLE:

(4) INTERNATIONAL MECHANICAL CODE (IMC) (5) NATIONAL ELECTRIC CODE (NEC)

(6) NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

(7) NATIONAL PRESSURE VESSEL CODE (8) STANDARD BUILDING CODES (SBC)

(9) STANDARD MECHANICAL CODES (SMC)

(10)UNIFORM BUILDING CODES (UBC) (11)UNIFORM MECHANICAL CODES (UMC)

H. ALL EQUIPMENT. MATERIALS AND, INSTALLATION METHODS SHALL COMPLY WITH THE FOLLOWING STANDARDS, WHERE APPLICABLE:

(1) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) (2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

(3) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

(4) AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

(5) AMERICAN WATER WORKS ASSOCIATION (AWWA) (6) AMERICAN WELDING SOCIETY (AWS)

(7) BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL (BOCA) (8) CAST IRON SOIL PIPE INSTITUTE (CISPI)

(9) CODES AND STANDARDS ASSOCIATION (CSA) (10)FLUID SEALING ASSOCIATION (FSA)

(11)INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO) (12) NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

(13)NATIONAL PRESSURE VESSEL CODE

(14) NATIONAL SANITATION FOUNDATION (NSF)

(15)NATIONAL SCIENCE FOUNDATION (NSF)

(16)PLASTIC PIPE INSTITUTE (PPI)

(17)SHEETMETAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. (SMACNA) (18)UNDERWRITER'S LABORATORIES OF CANADA (ULC)

(19)UNDERWRITER'S LABORATORIES, INC. (UL)

I. EACH CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR THE INSTALLATION OF THE WORK SHOWN. ALL PERMITS AND CERTIFICATES OF INSPECTION AND APPROVAL SIGNED BY THE CONTROLLING BUILDING DEPARTMENT OR AUTHORITY HAVING JURISDICTION SHALL

BECOME PROPERTY OF THE OWNER. DELIVER ALL CERTIFICATES TO THE OWNER IN DUPLICATE. J. ALL EQUIPMENT, MATERIALS AND INSTALLATION SHALL COMPLY WITH THE NATIONAL FIRE PROTECTION ASSOCIATION'S "NATIONAL FIRE CODES" AND "NATIONAL ELECTRICAL CODE". EQUIPMENT SHALL BEAR THE "UL" LABEL AS REQUIRED BY THESE CODES.

K. FOLLOWING COMPLETION OF THE WORK:

(1) FURNISH TO THE OWNER, DUPLICATE CERTIFICATES OF INSPECTION AND APPROVAL BY REGULATORY AGENCIES HAVING JURISDICTION.

(2) DEMONSTRATE TO THE OWNER'S SATISFACTION THE PROPER OPERATION OF EACH OF THE SYSTEMS COMPRISING THIS CONTRACT BEFORE FINAL PAYMENT.

(3) TEST PIPING FOR LEAKS; REPAIR LEAKS IN COPPER TUBING BY SWEATING OUT JOINTS, THOROUGHLY CLEANING BOTH TUBE AND FITTING, AND RESOLDERING OR REBRAZING; CORRECT LEAKS IN SCREWED JOINTS BY REPLACING THREAD OR FITTING OR BOTH (4) IMMEDIATELY CORRECT ANY WORK FOUND AT VARIANCE WITH THESE SPECIFICATIONS, THE NATIONAL, STATE, AND LOCAL CODES, AND REQUIREMENTS OF GOVERNING REGULATORY AGENCIES.

23 00 40 MECHANICAL DEMOLITION AND SALVAGE A. DEMOLITION WORK - SERVICES

COMPLETE ALL PUNCHLIST ITEMS OF THE ARCHITECT AND ENGINEER.

(1) ACTIVE SERVICES: WHEN ENCOUNTERED, SUPPORT ACTIVE MECHANICAL SERVICES AS NECESSARY. FACTIVE SERVICES REQUIRE RELOCATION (OTHER THAN THOSE INDICATED ON THE DRAWINGS), OBTAIN WRITTEN INSTRUCTIONS BEFORE PROCEEDING. DO NOT DISTURB ACTIVE SERVICES SCHEDULED TO REMAIN.

(2) <u>INACTIVE OR ABANDONED SERVICES</u>: WHEN ENCOUNTERED, REMOVE INACTIVE AND ABANDONED CTWORK AND PIPING FULL LENGTH, REMOVAL SHALL INCLUDE ALL HANGERS AND SUPPORTS. NOTIFY SERVICING UTILITY WHEN ENCOUNTERED OUTSIDE OF STRUCTURE. (3) INTERRUPTION OF SERVICE: SEE "HVAC SYSTEM SHUT-DOWNS" SECTION FOR PROCEDURES AND

(4) TIE-INS: IN AREAS WHERE NEW CONSTRUCTION TIES INTO EXISTING FACILITIES OR IN REMODELED AS, DISMANTLE THE EXISTING MECHANICAL FACILITIES AS NECESSARY. RELOCATE ANY EXISTING SERVICES INTERFERING WITH CONSTRUCTION. B. DEMOLITION WORK - GENERAL

(1) REMOVE OR RELOCATE THOSE MECHANICAL SERVICES SPECIFICALLY INDICATED ON THE DRAWINGS AND AS REQUIRED TO COMPLETE DEMOLITION WORK (2) REMOVE ALL EXISTING MECHANICAL EQUIPMENT, PIPING, DUCTWORK, DEVICES, CONTROLS AND

NIRING IN REMODELED AREAS THAT INTERFERE WITH NEW CONSTRUCTION AND ARE NOT NECESSARY TO MAINTAIN SERVICES THAT ARE TO REMAIN. (3) RELOCATE, OR EXTEND AS REQUIRED, MECHANICAL EQUIPMENT, PIPING, DUCTWORK, DEVICES AND WIRING THAT INTERFERES WITH NEW CONSTRUCTION AND IS ESSENTIAL TO MAINTAIN SERVICE TO EOUIPMENT AND DEVICES THAT ARE TO REMAIN.

(4) REMOVE OR RELOCATE THOSE MECHANICAL SERVICES SPECIFICALLY INDICATED ON THE DRAWINGS AND AS REQUIRED TO COMPLETE DEMOLITION WORK (5) ALL PIPING AND DUCTWORK AND WIRING TO BE REMOVED SHALL BE REMOVED FULL LENGTH BACK TO

(6) ALL HOLES OR DAMAGE CAUSED BY THE REMOVAL OF EXISTING WORK SHALL BE PROPERLY PATCHED HOLES SHALL BE NEATLY PATCHED WITH SUITABLE MATERIALS TO MATCH EXISTING SURFACES.

C. SAFE DISPOSAL OF HAZARDOUS MATERIALS (1) MECHANICAL CONTRACTOR SHALL SAFELY DISPOSE OF ALL HAZARDOUS MATERIALS ENCOUNTERED IN FULL COMPLIANCE WITH ALL FEDERAL, STATE, AND EPA REGULATIONS.

MODIFICATION THAT ARE SUSPECTED TO CONTAIN ASBESTOS INSULATION. IF SUSPICIOUS INSULATION IS ENCOUNTERED, THE MECHANICAL CONTRACTOR WILL CEASE DEMOLITION OR MODIFICATIONS AND SHALL NOTIFY THE OWNER. (3) THE MECHANICAL CONTRACTOR SHALL NOT BE RESPONSIBLE FOR REMOVAL OF ASBESTOS

(2) MECHANICAL CONTRACTOR SHALL IDENTIFY INSTALLED FACILITIES REOUIRING REMOVAL OR

INSULATION. (4) THE MECHANICAL CONTRACTOR SHALL WORK WITH THE OWNER'S ASBESTOS REMOVAL AND ABATEMENT CONTRACTOR TO PRIORITIZE ABATEMENT WORK AND DEVELOP A SCHEDULE FOR REMOVAL OF HAZARDOUS MATERIALS SO AS NOT TO AFFECT THE MECHANICAL CONTRACTUAL

D. SALVAGE (1) MECHANICAL EQUIPMENT, PIPING AND DEVICES THAT ARE TO BE REMOVED SHALL BE OFFERED TO THE OWNER FOR SALVAGE. EQUIPMENT, PIPING AND DEVICES SELECTED SHALL BE STORED ON THE SITE AT AREAS DESIGNATED BY THE OWNER.

(2) ALL ITEMS NOT SELECTED FOR SALVAGE BY THE OWNER SHALL BECOME THE PROPERTY OF THE MECHANICAL CONTRACTOR AND SHALL BE REMOVED FROM THE SITE BY THE MECHANICAL CONTRACTOR. E. CLEAN-UP

AND ORDERLY CONDITION. FOLLOW EXPLICITLY ANY INSTRUCTIONS OF ARCHITECT IN REGARD TO STORING OF MATERIALS, PROTECTIVE MEASURES, AND CLEANING-UP OF DEBRIS. (2) UPON COMPLETION OF THE WORK, THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL APPARATUS FURNISHED UNDER THIS CONTRACT, PACK ALL VALVES, AND THOROUGHLY CLEAN ALL PIPING,

(1) INSOFAR AS THIS CONTRACT IS CONCERNED. AT ALL TIMES KEEP PREMISES AND BUILDING IN NEAT

FIXTURES, AND EQUIPMENT, REMOVING ALL DIRT, GREASE, AND OIL. (3) AIR HANDLING SYSTEMS SHALL NOT BE OPERATED WITHOUT FILTERS. UPON COMPLETION OF WORK, REPLACE ALL FILTERS. 23 01 20 SHOP DRAWINGS

A. THIS CONTRACTOR SHALL REVIEW, STAMP WITH HIS APPROVAL AND SUBMIT, WITH REASONABLE PROMPTNESS AND IN ORDERLY SEQUENCE SO AS TO CAUSE NO DELAY IN THE WORK OR IN THE WORK OF ANY OTHER CONTRACTOR, ALL SHOP DRAWINGS AND SAMPLES REQUIRED BY THE CONTRACT DOCUMENTS. CAUSE FOR REJECTION. SUCH SUBMITTALS SHALL BE RETURNED WITHOUT REVIEW

C. IF THE SUBMITTAL INCLUDES DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL CLEARLY NOTE THE DEVIATIONS "IN RED" ON THE SUBMITTAL. D. INDICATE SPECIFIC OPTIONS OR ACCESSORIES ON SHOP DRAWINGS BY POINTING TO, CHECKING OFF, OR UNDERLINING. <u>DO NOT USE HIGHLIGHTER.</u>

E. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD INFORMATION AS THE BASIS OF SHOP DRAWINGS. STANDARD INFORMATION PREPARED WITHOUT SPECIFIC REFERENCE TO THE PROJECT IS NOT CONSIDERED SHOP DRAWINGS AND WILL BE CAUSE FOR REJECTION. F IN CHECKING SHOP DRAWINGS. THE ENGINEER AND ARCHITECT WILL MAKE EVERY EFFORT TO DETECT AND CORRECT ERRORS. OMISSIONS AND INACCURACIES IN SUCH DRAWINGS, BUT HIS FAILURE TO DETECT FRRORS, OMISSIONS AND INACCURACIES SHALL NOT RELIEVE THE CONTRACTOR OF

RESPONSIBILITY FOR THE PROPER AND COMPLETE INSTALLATION IN ACCORDANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS. G. WHERE ONLY ONE MAKE OF EQUIPMENT IS NAMED, IT SHALL BE PROVIDED AS SPECIFIED.

H. VERBAL REQUESTS OF APPROVALS FOR ANY SUBSTITUTION WILL NOT BE BINDING ON THE ARCHITECT, ENGINEER, OR OWNER I. ALL SUBMITTALS SHALL BE IN ELECTRONIC FORMAT. ELECTRONIC SUBMITTALS SHALL CONFORM TO THIS SPECIFICATION.

(1) ELECTRONIC SUBMITTALS SHALL BE IN PORTABLE DOCUMENT FORMAT (.PDF). (A) ELECTRONIC SUBMITTALS SHALL INCLUDE A TRANSMITTAL

(B) ALL PORTIONS OF THE ELECTRONIC SUBMITTAL SHALL BE BOUND IN A SINGLE .PDF FILE. (C) FILE SHALL BE NAMED TO MATCH SUBMITTAL NAME AS IT APPEARS IN THE SPECIFICATIONS. EXAMPLE: "GRILLES AND DIFFUSERS (D) SUBMITTALS SHALL SPECIFICALLY IDENTIFY ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS.

(2) ELECTRONIC SUBMITTALS SHALL INCLUDE A CONTRACTOR REVIEW STAMP THAT INDICATES REVIEW AND APPROVAL BY THE CONTRACTOR PRIOR TO SUBMISSION. (3) ELECTRONIC SUBMITTALS SHALL BE TRANSMITTED VIA AN E-MAIL:

(A) PROVIDE ONLY ONE SUBMITTAL PER E-MAIL (B) E-MAIL SUBJECT LINE SHALL CLEARLY INDICATE:

(4) PROJECT NAME (5) THAT THE E-MAIL CONTAINS A SUBMITTAL

(6) CONTENTS OF SUBMITTAL J. FAILURE TO CONFORM THE REQUIREMENTS ABOVE MAY RESULT IN REJECTION.

K. AT THE REVIEWER'S DISCRETION, THE REVIEWER HAS THE OPTION TO RETURN THE SUBMITTALS IN WHATEVER METHOD IS MOST CONVENIENT OR APPROPRIATE FOR THE PROJECT. L. "BASIS OF DESIGN" EQUIPMENT (1) WHERE MORE THAN ONE MANUFACTURER IS LISTED IN THE SPECIFICATIONS AS BEING ACCEPTABLE,

EQUIPMENT SCHEDULE OR NOTED WITH THE MODEL NUMBER LISTED. ALL OTHER LISTED MANUFACTURERS ARE CONSIDERED AS ACCEPTABLE ALTERNATIVES. IF INSTALLATION OF AN ACCEPTABLE ALTERNATIVE ALTERS THE DESIGN, ELECTRICAL OR SPACE REQUIREMENTS INDICATED ON THE DRAWINGS, THIS CONTRACTOR SHALL BEAR THE COSTS FOR THE REVISED DESIGN AND CONSTRUCTION INCLUDING COSTS OF ALL TRADES INVOLVED.

23 01 40 OPERATING AND MAINTENANCE MANUALS A. THIS CONTRACTOR SHALL SUPPLY THE OWNER WITH THREE (3) COPIES OF OPERATION MANUALS CONTAINING THE FOLLOWING:

(1) PERFORMANCE DATA, RATINGS. (2) MANUFACTURER'S DESCRIPTIVE LITERATURE.

(3) AUTOMATIC CONTROLS WITH DIAGRAMS AND WRITTEN DESCRIPTION OF OPERATION.

(4) MANUFACTURER'S MAINTENANCE AND SERVICE MANUALS.

(5) SPARE PARTS AND REPLACEMENT PARTS LIST FOR EACH PIECE OF EQUIPMENT. (6) NAME OF SERVICE AGENCY AND INSTALLER.

(7) FINAL APPROVED SHOP DRAWINGS (8) STEP-BY-STEP PROCEDURES FOR START-UP AND SHUT-DOWN FOR EACH SYSTEM AND PIECE OF EQUIPMENT.

(9) WIRING DIAGRAMS.

(10) FINAL BALANCE REPORT 23 01 50 RECORD DRAWINGS

A. AS WORK PROGRESSES, RECORD IN RED INK ON A SET OF "AS-BUILT" PRINTS ANY DEVIATIONS FROM DESIGN DRAWINGS. DELIVER TO THE OWNER BEFORE SUBMITTING REQUEST FOR FINAL PAYMENT. THE "AS-BUILT" PRINTS SHALL BE AN ACCURATE DEPICTION OF THE PROJECT AS COMPLETED. 23 02 10 OWNER AND OPERATING AND MAINTENANCE TRAINING

A. PROVIDE TO OWNER AFTER ALL EQUIPMENT IS IN OPERATION AND AT AN AGREEABLE TIME INSTRUCTIONS FOR THE PURPOSE OF TRAINING OWNER'S PERSONNEL IN ALL PHASES OF OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS. SCHEDULE TRAINING WITH OWNER, PROVIDE AT LEAST SEVEN DAYS PRIOR NOTICE

A. THIS CONTRACTOR SHALL SECURE THE SERVICES OF AN INDEPENDENT CERTIFIED A.A.B.C. OR NEED TESTING, ADJUSTING, AND BALANCING (TAB) COMPANY TO ACCOMPLISH BALANCING OF HYDRONIC AND AIR SYSTEMS. BALANCING COMPANY SHALL HAVE PROVEN CAPABILITY IN WORK OF THE TYPE AND SIZ AS PRESENTED BY THIS BUILDING. THE BALANCING AGENCY SHALL ADJUST AND BALANCE ALL SYSTEMS COMPONENTS TO NO MORE THAN 10 PERCENT ABOVE OR 5 PERCENT BELOW DESIGN REQUIREMENTS MARK EOUIPMENT SETTINGS, INCLUDING DAMPER AND VALVE POSITIONS AND SIMILAR CONTROLS AND DEVICES TO SHOW FINAL SETTINGS. MARK WITH PAINT OR OTHER SUITABLE PERMANENT IDENTIFICATION MATERIALS. SUBMIT AN ELECTRONIC COPY OF THE BALANCE REPORT AT PROJECT

COMPLETION. INCLUDE ONE APPROVED SET IN EACH OPERATION AND MAINTENANCE MANUAL. B. THE WORK OF THIS SECTION SHALL BE THE RESPONSIBILITY OF THE TESTING AND BALANCING CONTRACTOR WORKING AS AN INDEPENDENT SUB-CONTRACTOR TO THE MECHANICAL CONTRACTOR. THE MECHANICAL AND CONTROLS CONTRACTOR SHALL PROVIDE LABOR AND MATERIALS TO COORDINATE

(1) THE MECHANICAL CONTRACTOR SHALL MAKE ALL CHANGES IN SHEAVES, BELTS AND DAMPERS AS REQUIRED BY THE TESTING AND BALANCING CONTRACTOR. (2) THE MECHANICAL CONTRACTOR SHALL ADD ALL BALANCING DAMPERS AS REQUIRED BY THE TESTING AND BALANCING CONTRACTOR.

(3) THE CONTROLS CONTRACTOR SHALL ADD VERIFY THAT ALL CONTROL COMPONENTS ARE FUNCTIONAL, CALIBRATED PROPERLY AND SET FOR DESIGN OPERATING CONDITIONS AND SHALL ASSIST THE FESTING AND BALANCING CONTRACTOR AS REQUIRED FOR A COMPLETE TESTING, ADJUSTING AND (4) ALL VARIABLE PITCH SHEAVES SHALL BE REPLACED WITH CONSTANT PITCH SHEAVES AT THE TIME OF

FINAL BALANCING BY THE MECHANICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE

(6) THE BALANCING CONTRACTOR SHALL WORK WITH THE VARIABLE FREQUENCY DRIVE (VFD)

(A) AIR DISTRIBUTION (GRILLES, DIFFUSERS, REGISTERS)

(B) EXHAUST FANS

RESPONSIBLE TO FURNISH AND INSTALL REPLACEMENT SHEAVES AND BELTS. (5) THE BALANCING CONTRACTOR SHALL WORK WITH THE CONTROLS CONTRACTOR TO ESTABLISH DUCT STATIC PRESSURES AND HYDRONIC DIFFERENTIAL PRESSURES FOR HYDRONIC AND AIR MOVING EQUIPMENT. THESE SETPOINTS SHALL BE NOTED IN THE BALANCE REPORT AND EACH EQUIPMENT SENSOR LOCATION SHALL ALSO BE NOTED IN THE BALANCE REPORT.

MANUFACTURER'S START-UP REPRESENTATIVE TO DETERMINE ALL RESONANT FREQUENCIES FOUND

ON VFD-DRIVEN FANS AND PUMPS. THESE RESONANT FREQUENCIES SHALL BE NOTED IN THE BALANCE REPORTS AND SHALL BE PROGRAMMED BY THE VFD TECHNICIAN FOR CRITICAL AVOIDANCE (7) THE FOLLOWING DEVICES AND EQUIPMENT SHALL BE MEASURED AND DOCUMENTED IN THE BALANCE C. REQUIREMENT FOR SPECIFIC SYSTEM COMPONENTS

A. MOTORS

(1) DIFFUSERS, GRILLES, EXHAUST FANS, AND REGISTERS (A) IDENTIFY EACH DIFFUSER, GRILLE AND REGISTER AS TO LOCATION AND AREA. TABULATE DESIGN VELOCITY AND CFM, AND TEST VELOCITY AND CFM AFTER ADJUSTMENT AND LIST SIZE. AND TYPE OF DIFFUSERS, GRILLES AND REGISTERS. ADJUST SUPPLY DIFFUSERS, GRILLES AND

REGISTERS FOR PROPER AIR DISTRIBUTION PATTERN TO ELIMINATE DRAFTS. 23 05 10 ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

(1) FOR EACH ITEM OF EOUIPMENT REQUIRING ELECTRIC DRIVE, PROVIDE AN INDUCTION MOTOR HAVING STARTING AND RUNNING CHARACTERISTICS CONSISTENT WITH THE TOROUE AND SPEED REQUIREMENTS OF THE DRIVEN EQUIPMENT. IN NO CASE SHALL POWER REQUIREMENTS OF THE DRIVEN EOUIPMENT EXCEED THE NOMINAL NAMEPLATE RATING OF THE FURNISHED MOTOR (DO NOT TAKE ADVANTAGE OF SERVICE FACTORS IN SELECTING MOTORS). FOR DESIGN, CONSTRUCTION AND PERFORMANCE CHARACTERISTICS, CONFORM TO APPLICABLE PROVISIONS OF LATEST NEMA AND IEEE STANDARDS FOR ROTATING FLECTRICAL FOUIPMENT (2) MOTORS SHALL BE DOE 2016 ENERGY EFFICIENT IN ACCORDANCE WITH NEMA MG 1-2021. THE

MOTOR NAMEPLATE SHALL IDENTIFY "NEMA PREMIUM" AND MEET ENERGY EFFICIENCY REOUIREMEN' FOR ALL VOLTAGES LISTED ON THE NAMEPLATE. REFER TO THE DRAWINGS FOR SYSTEM VOLTAGE JSE 200V RATED MOTORS USED FOR 208V SYSTEMS AND 460V RATED MOTORS USED FOR 480V SYSTEMS. 460V NAMEPLATED MOTORS SHALL NOT BE USED ON 208V SYSTEMS EVEN IF "USABLE AT 208V" IS LISTED ON THE DATASHEET. (3) UNLESS OTHERWISE SPECIFIED, MOTORS ARE TO BE GENERAL-PURPOSE OPEN-DRIP PROOF TYPE.

WITH CLASS B INSULATION, RATED FOR CONTINUOUS OPERATION IN 40°C AMBIENT TEMPERATURE. ALL MOTORS UTILIZED WITH VARIABLE FREQUENCY DRIVES SHALL BE "INVERTER READY" MOTOR WITH CLASS F INSULATION IN ACCORDANCE WITH NEMA MG1 PART 31.4.4.2. ALL MOTORS UTILIZED WITH VARIABLE FREQUENCY DRIVES SHALL BE PROVIDED WITH A SHAFT GROUND RING IN COMPLIANCE WITH NEMA MG1 31.4.4.3.

SINGLE PHASE, CAPACITOR START TYPE, WITH BALL BEARINGS. SHADED-POLE TYPE WITH SLEEVE BEARINGS ARE ACCEPTABLE ONLY FOR MOTORS LESS THAN 1/16 HP. (B) UNLESS OTHERWISE SCHEDULED ON THE DRAWINGS, MOTORS 3/4 HP AND LARGER SHALL BE THREE PHASE, SQUIRREL-CAGE TYPE WITH BALL BEARINGS. (C) BALL BEARINGS SHALL BE REGREASABLE, EXCEPT WHERE MOTOR IS NORMALLY INACCESSIBLE

(A) UNLESS OTHERWISE SCHEDULED ON THE DRAWINGS, MOTORS 1/2 HP AND SMALLER SHALL BE

FOR REGULAR MAINTENANCE, PERMANENTLY SEALED BALL BEARINGS SHALL BE PROVIDED. (4) MOTORS SHALL HAVE A MINIMUM EFFICIENCY AS FOLLOWS IN ACCORDANCE WITH IEEE STANDARD 112, TEST METHOD B. IF HORSEPOWER IS NOT LISTED, MOTORS SHALL HAVE A HIGHER EFFICIENCY THAN "AVERAGE STANDARD INDUSTRY MOTORS" IN ACCORDANCE WITH IEEE STANDARD 112, TEST

RATINGS, CHARACTERISTICS, CONSTRUCTION, EFFICIENCY AND SPECIAL FEATURES (6) ACCEPTABLE MOTOR MANUFACTURERS: A.O. SMITH, BALDOR (RELIANCE), EMERSON, GENERAL ELECTRIC, LEESON, LOUIS ALLIS, MARATHON ELECTRIC, TECO-WESTINGHOUSE. B. MANUAL MOTOR STARTERS

(5) MOTORS SHALL BE FURNISHED WITH STAINLESS STEEL NAMEPLATE INDICATING MANUFACTURER,

(1) IN GENERAL, SINGLE PHASE MOTORS SHALL BE EOUIPPED WITH MANUAL MOTOR STARTERS. MANUAL NOTOR STARTERS SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS SPECIFIED IN DIVISION 26 UNLESS NOTED OTHERWISE ON THE DIVISION 23 DRAWINGS OR IN THE DIVISION 23 SPECIFICATIONS. (2) ENCLOSURES IN DRY INDOOR LOCATIONS SHALL BE GENERAL PURPOSE NEMA TYPE 1. UNLESS NOTED OTHERWISE. ENCLOSURES IN WET INDOOR OR OUTDOOR LOCATIONS SHALL BE NEMA TYPE 4

(STAINLESS STEEL, UNLESS NOTED OTHERWISE).

(A) "HAND-OFF-AUTO" SELECTOR SWITCH IN COVER.

(3) MANUAL MOTOR STARTER SHALL INCLUDE NEON PILOT LIGHT, "QUICK-MAKE, QUICK-BREAK" TRIP-FREE TOGGLE MECHANISM AND MELTING ALLOY THERMAL OVERLOAD RELAY SIZED TO PROTECT THE MOTOR. C. COMBINATION MOTOR STARTERS (1) IN GENERAL, THREE PHASE MOTORS SHALL BE EQUIPPED WITH COMBINATION MOTOR STARTERS.

CONTRACTOR AS SPECIFIED IN DIVISION 26 UNLESS NOTED OTHERWISE ON THE DIVISION 23 DRAWINGS OR IN THE DIVISION 23 SPECIFICATIONS. (2) ENCLOSURES IN DRY INDOOR LOCATIONS SHALL BE GENERAL PURPOSE NEMA TYPE 1, UNLESS NOTED OTHERWISE. ENCLOSURES IN WET INDOOR OR OUTDOOR LOCATIONS SHALL BE NEMA TYPE 4 (STAINLESS STEEL, UNLESS NOTED OTHERWISE).

COMBINATION MOTOR STARTERS SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL

(3) SIZE OF STARTERS SHALL BE AS RECOMMENDED BY THE MOTOR OR DRIVEN EQUIPMENT

(4) COMBINATION MOTOR STARTERS SHALL INCLUDE A DISCONNECT AS SPECIFIED IN THE FOLLOWING SECTION "2.5 DISCONNECT SWITCHES". STARTER SHALL BE FURNISHED WITH THE FOLLOWING

(B) HEAVY DUTY PUSH-TO-TEST RED PILOT LIGHT TO ILLUMINATE WHEN MOTOR IS RUNNING. (C) CONTROL POWER TRANSFORMER (COORDINATE SECONDARY VOLTAGE WITH REQUIRED CONTROL VOLTAGE). CONTROL TRANSFORMER PRIMARY SHALL BE CONNECTED TO THE LOAD SIDE OF THE INCOMING LINE DISCONNECT FUSES AND THE SECONDARY SHALL BE FUSED AND GROUNDED. (D) THREE (3) BI-METAL TYPE THERMAL OVERLOAD ELEMENTS. THE STARTER SHALL BE INOPERATIVE IF ANY THERMAL ELEMENT IS REMOVED.

(E) MINIMUM OF TWO NO/NC FIELD CONVERTIBLE AUXILIARY CONTACTS, TWO NO AND TWO NC CONTACTS MAY BE FURNISHED IN LIEU OF CONVERTIBLE CONTACTS. D. DISCONNECT SWITCHES (1) DISCONNECT SWITCHES SHALL BE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS

DIVISION 23 SPECIFICATIONS. (2) IN DRY INDOOR LOCATIONS, ENCLOSURES SHALL BE GENERAL PURPOSE NEMA TYPE 1, UNLESS NOTED OTHERWISE. IN WET INDOOR OR OUTDOOR LOCATIONS ENCLOSURES SHALL BE NEMA TYPE 4 (STAINLESS STEEL), UNLESS NOTED OTHERWISE. (3) SIZE OF DISCONNECT SWITCHES SHALL BE AS RECOMMENDED BY THE MOTOR OR DRIVEN EQUIPMENT

SPECIFIED IN DIVISION 26 UNLESS NOTED OTHERWISE ON THE DIVISION 23 DRAWINGS OR IN THE

(4) DISCONNECT SWITCHES SHALL BE FUSIBLE TYPE, WITH CLASS R REJECTION FUSE CLIPS (A) THE DISCONNECT HANDLE SHALL ALWAYS BE IN CONTROL OF THE DISCONNECT DEVICE WITH THE DOOR OPEN OR CLOSED. THE DISCONNECT HANDLE SHALL BE CLEARLY MARKED AS TO WHETHER THE DISCONNECT DEVICE IS "ON" OR "OFF", AND SHALL INCLUDE A TWO-COLOR HANDLE GRIP, THE BLACK SIDE VISIBLE IN THE "OFF" POSITION INDICATING A SAFE CONDITION, AND THE RED SIDE VISIBLE IN THE "ON" POSITION INDICATING A DANGEROUS CONDITION. (B) DISCONNECT HANDLE SHALL CONTAIN PROVISIONS FOR PADLOCKING IN THE "OFF" POSITION (C) IF REOUIRED, THE DISCONNECT SWITCH SHALL BE FURNISHED WITH ONE AUXILIARY SPDT

CONTACT FOR USE BY THE CONTROLS CONTRACTOR TO DE-ENERGIZE REMOTELY POWERED INTERLOCK WIRING WHEN THE DISCONNECT IS IN THE "OFF" POSITION. (5) DISCONNECT SWITCHES SHALL BE FURNISHED WITH A GROUND LUG.

23 07 10 CUTTING, PATCHING, AND FIRESTOPPING A. ALL CUTTING AND PATCHING REQUIRED FOR THE INSTALLATION OF THE WORK SHOWN SHALL BE DONE BY

EACH INDIVIDUAL CONTRACTOR. B. HOLES THROUGH FLOORS, MASONRY WALLS, CONCRETE WALLS, OR FIRE WALLS SHALL BE SEALED WITH THE APPROPRIATE INTUMESCENT CAULK, PUTTY, STRIP OR SHEET TYPE FIRE BARRIER PRODUCT. FIRESTOP ASSEMBLY TYPE (REOUIRED FIRESTOPPING MATERIALS) SHALL BE DETERMINED BY THE WALL OR FLOOR/CEILING ASSEMBLY AND PENETRATION TYPE AND SHALL BE UL LISTED AND TESTED IN ACCORDANCE WITH ASTM E814. FIRE RATING OF THE ASSEMBLY SHALL BE EQUIVALENT TO THE WALL OR

FLOOR/CEILING ASSEMBLY RATING. (1) REFER TO FIRESTOP SPECIFICATION FOR ADDITIONAL DETAILS. (2) ACTUAL PROJECT CONDITIONS MAY REOUIRE A UL SYSTEM NOT SPECIFICALLY DESCRIBED ABOVE FIRE BARRIER PRODUCTS MANUFACTURER SHALL PROVIDE A UL SYSTEM TO MEET ACTUAL PROJECT

(3) ACCEPTABLE FIRE BARRIER PRODUCT MANUFACTURERS: 3M; FIRE PROTECTION PRODUCTS DIVISION, FIRETRAK CORP, HILTI, INC., SPECIFIED TECHNOLOGIES INC., THERMAFIBER SAFING D. EACH CONTRACTOR SHALL BE RESPONSIBLE TO TOUCH UP AND REPAIR ANY DAMAGED FACTORY FINISHES ON EQUIPMENT AND MATERIALS FURNISHED. COMPLETE ADDITIONAL PAINTING AS INDICATED ON THE DRAWINGS. OTHER PAINTING WILL COMPLY WITH THE PAINTING DIVISION OF THE SPECIFICATIONS. 23 07 11 ROOF EQUIPMENT SUPPORT RAILS

A. ROOF EQUIPMENT, PIPING AND DUCT SUPPORTS (1) FABRICATE ROOF CURBS AND ROOF SUPPORT CURBS FROM ZINC-COATED STEEL, ASTM A 146, GRADE DESIGNATION G90 HOT-DIP COATING, MILL PHOSPHATIZED. CLEAN AND PAINT WITH RUST-INHIBITIVE METAL PRIMER PAINT OF TYPE RECOMMENDED BY MANUFACTURER, 2.0 MILS DRY (2) REINFORCE CONTINUOUS RUNS OF OVER 3'-0" LENGTH, BY INSERTING WELDED STIFFENERS OF HEAVY GAUGE WITH FLANGES AS REQUIRED TO PROVIDE SUFFICIENT RIGIDITY AND STRENGTH TO WITHSTAND MAXIMUM LATERAL FORCES IN ADDITION TO SUPERIMPOSED VERTICAL LOADS.

(3) FABRICATE CURBS OF MINIMUM 18 GAUGE GALVANIZED METAL AND TO A MINIMUM HEIGHT ABOVE (4) PROVIDE PRESSURE TREATED WOOD NAILER, NOT LESS THAN 1-5/8" THICK AND OF WIDTH INDICATED, BUT NOT LESS THAN WIDTH OF SUPPORT WALL ASSEMBLY. ANCHOR NAILER SECURELY TO TOP OF METAL FRAME UNIT. WOOD SHALL BE PRESSURE TREATED WITH WATER-BORNE

PRESERVATIVES FOR "ABOVE GROUND" USE, COMPLYING WITH AWPB LP-2. (5) INSULATE CURB'S INSIDE STRUCTURAL SUPPORT WALL WITH RIGID GLASS FIBER INSULATING BOARD OF APPROXIMATELY 3 LB. DENSITY AND 1½" MINIMUM THICKNESS, EXCEPT AS OTHERWISE

B. ACCEPTABLE MANUFACTURERS (1) SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PREFABRICATED ROOF CURBS MANUFACTURED BY ONE OF THE FOLLOWING

(A) CUSTOM CURB, INC. (B) PATE CO. (C) ROOF PRODUCTS & SYSTEMS CORP.

(D) THYCURB DIV.; THYBAR CORP.

(A) INERTIA BASES

D. FLEXIBLE CONNECTIONS

23 08 10 VIBRATION ISOLATION A. BASE-MOUNTED EQUIPMENT (1) SUPPORT BASE-MOUNTED EQUIPMENT ON ONE OF THE FOLLOWING, AS IDENTIFIED ON THE DRAWINGS:

(B) SPRING ISOLATORS (C) NEOPRENE ISOLATORS (1) CEILING SUSPENDED FANS SHALL BE SUSPENDED BY THREADED RODS FROM THE OVERHEAD STRUCTURE WITH TWO INCH DEFLECTION SPRING TYPE VIBRATION ISOLATORS AT THE MOUNTING

(2) MOUNTING BRACKET WITH VIBRATION ISOLATORS SHALL BE FURNISHED BY THE EQUIPMENT MANUFACTURER. C. PIPING AND DUCTWORK SUPPORTS (1) SHALL BE SUPPORTED INDEPENDENTLY OF THE EQUIPMENT AND SHALL BE ISOLATED AS FOLLOWS:

(A) SUSPENDED PIPING ENTERING OR LEAVING BASE MOUNTED PUMPS SHALL BE SUPPORTED FOR

THE FIRST THREE HANGERS/SUPPORTS FROM THE EXISTING PIPING SUPPORT STRUCTURE. THE

RESILIENT HANGERS SHALL CONTAIN STEEL SPRINGS AND PRE-COMPRESSED MOLDED. FIBERGLASS INSERTS, DESIGNED FOR STATIC DEFLECTIONS BETWEEN 1" AND 1-3/4" UNDER OPERATING CONDITIONS. (B) ALL FLOOR SUPPORTED PIPING AND PIPE HANGERS IN THE MECHANICAL EQUIPMENT ROOMS SHALL BE MOUNTED ON STEEL SPRING VIBRATION ISOLATORS IN COMBINATION WITH PRE-COMPRESSED MOLDED FIBERGLASS NOISE ISOLATORS, DESIGNED FOR MINIMUM STATIC

(1) FANS SHALL BE SUPPORTED INDEPENDENTLY OF CASINGS AND DUCTWORK WITH FLEXIBLE CANVASS CONNECTIONS FLEXIBLE CANVAS DUCT SHALL COMPLY WITH NEPA 90A FLEXIBLE CONNECTOR SHALL BE FACTORY FABRICATED WITH FABRIC STRIP ATTACHED TO 2 STRIPS OF 2-3/4 INCH-WIDE 0.028-INCH-THICK GALVANIZED-STEEL SHEET (A) FLEXIBLE CONNECTOR FABRIC SHALL CONSIST OF GLASS FABRIC, DOUBLE COATED WITH NEOPRENE. FABRICS, COATINGS, AND ADHESIVE SHALL COMPLY WITH UL 181, CLASS 1.

 FAVRIC MINIMUM WEIGHT: 260Z./SO.YD. II. FABRIC TENSILE STRENGTH: 480 IBF/INCH IN THE WARP AND 360 IBF/INCH IN THE FILLING. III. FABRIC SERVICE TEMPERATURE: MINUS 40 TO PLUS 200°F.

E. ACCEPTABLE MANUFACTURERS

(1) SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ISOLATORS AS MANUFACTURED BY ONE OF THE FOLLOWING: (A) AMBER BOOTH

(B) CONSOLIDATED KINETICS CORP.

(C) FLEX-HOSE CO. (D) KEFLEX

(E) MASON INDUSTRIES, INC.

23 10 10 PIPING SYSTEMS - GENERA

(F) METRAFLEX (G) TWIN CITY HOSE, INC. (H) VIBRO ACOUSTICS

A. PROVIDE PIPING MATERIALS AND FACTORY-FABRICATED PIPING PRODUCTS OF SIZES, TYPES, PRESSURE RATINGS, TEMPERATURE RATINGS AND CAPACITIES AS DETERMINED BY INSTALLER TO COMPLY WITH INSTALLATION REQUIREMENTS. PROVIDE SIZES AND TYPES MATCHING PIPING CONNECTIONS; PROVIDE FITTINGS OF MATERIALS, WHICH MATCH PIPE MATERIALS USED IN FIRE PROTECTION SYSTEMS. WHERE MORE THAN ONE TYPE OF MATERIALS OR PRODUCTS ARE INDICATED, SELECTION IS INSTALLER'S OPTION.

HVAC PIPE AND FITTING SCHEDULE. C. FACTORY FORMED FITTINGS SHALL BE UTILIZED FOR ALL CHANGES IN DIRECTION, CHANGES IN SIZE AND ALL BRANCH CONNECTIONS.

B. GENERAL - ALL HVAC PIPING AND FITTINGS SHALL BE CONSTRUCTED OF MATERIALS AS SPECIFIED IN THE

D. ALL PIPING SHALL BE INSTALLED PARALLEL WITH, OR AT RIGHT ANGLES TO, THE BUILDING WALLS. AGONAL RUNS ARE NOT PERMITTED UNLESS EXPRESSLY INDICATED ON THE DRAWINGS. ALL VERTICAL RISERS SHALL BE INSTALLED PLUMB AND STRAIGHT. E. ALL HYDRONIC PIPING SHALL BE INSTALLED WITH A PITCH IN THE DIRECTION OF FLOW OF NOT LESS

THAN ONE INCH IN FORTY FEET, EXCEPT AS OTHERWISE SHOWN F. LONG RADIUS ELBOWS SHALL BE UTILIZED FOR ALL HYDRONIC PIPING SYSTEMS. G. REAM ENDS OF PIPES AND TUBES AND REMOVE BURRS AND REMOVE SCALE, SLAG, DIRT AND DEBRIS

FROM BOTH INSIDE AND OUTSIDE OF PIPING AND FITTINGS BEFORE ASSEMBLY H. BEFORE ANY PIPING IS INSTALLED. IT SHALL BE UP-ENDED AND POUNDED TO REMOVE ANY FOREIGN MATTER PRESENT, AND SHALL BE SWABBED, IF NECESSARY, FOR THOROUGH CLEANING. HYDRONIC CONNECTIONS BETWEEN COPPER PIPING AND SCREWED FERROUS EQUIPMENT CONNECTIONS OR SCREWED FERROUS PIPING SYSTEMS SHALL BE MADE USING DIELECTRIC NIPPLES. DIELECTRIC

UNIONS ARE NOT ALLOWED. BRASS VALVES FOR DIELECTRIC SEPARATION ARE NOT ALLOWED. J. THREADED JOINTS SHALL CONFORM TO AMERICAN TAPER PIPE THREAD ASA-B2.1-1960. ALL BURRS SHALL BE REMOVED, PIPE ENDS SHALL BE REAMED OR FILED TO SIZE OF BORE AND ALL CHIPS REMOVED. K COPPER WATER PIPING JOINTS SHALL BE MADE WITH THE SCHEDULED FITTINGS. SURFACES TO BE SOLDERED SHALL BE CLEANED BRIGHT, PROPERLY FLUXED AND MADE WITH SOLDER OF NOT LESS THAN

95-5, 50-50 AND ALL OTHER LEAD BEARING SOLDERS ARE PROHIBITED.

ENCOUNTERED FROM SOLDERING AND WELDING PROCEDURES WILL BE CORRECTED THROUGH THE EXPENSE OF THIS CONTRACTOR. M. THE PLUMBING CONTRACTOR SHALL PAINT ALL BLACK STEEL NATURAL GAS PIPING EXPOSED TO THE OUTDOORS. PIPE SHALL BE PRIMED AND PAINTED WITH TWO COATS OF WEATHER RESISTANT PAINT OF A COLOR AS SELECTED BY THE ARCHITECT.

L. DURING SOLDERING AND WELDING PROCEDURES, THIS CONTRACTOR SHALL PROTECT THE BUILDING'S

WALLS, FLOORS, AND CEILING AND ALL STRUCTURES AND FINISHES FROM DAMAGE. ALL DAMAGE

23 11 10 PIPING INSULATION: A. EACH CONTRACTOR SHALL FURNISH AND INSTALL ALL INSULATION NECESSARY TO THE PROJECT AND IN ACCORDANCE WITH THE FOLLOWING SCHEDULE. ALL INSULATION AND ACCESSORIES USED SHALL HAVE A COMPOSITE (INSULATION, JACKET AND ADHESIVE) FIRE AND SMOKE HAZARD RATING AS TESTED UNDER PROCEDURE ASTM E-84, NFPA 255 AND UL 723, NOT EXCEEDING A FLAME SPREAD 25 AND SMOKE DEVELOPED 50. INSULATION SHALL BE RATED FOR INSTALLATION IN PLENUM CEILINGS. B. MATERIALS:

(1) ALL INSULATION WORK SHALL BE INSTALLED WHERE INDICATED IN THE INSULATION SCHEDULE AND SHALL BE OF THE THICKNESS AND MATERIALS CONFORMING WITH THE INSULATION SCHEDULE. C. ACCEPTABLE MANUFACTURERS FOR FIBERGLASS INSULATION PRODUCTS: OWENS CORNING, KNAUF, CERTAIN TEED, OR JOHNS MANVILLE.

D. ACCEPTABLE MANUFACTURERS FOR CLOSED-CELL ELASTOMERIC AND POLYMERIC INSULATION PRODUCTS:

AEROCEL, ARMACELL, HALSTEAD, NOMACO, OR RUBATEX. (1) IN ADDITION TO THE INSULATION AND NORMAL FINISH, ALL OUTDOOR PIPING SHALL BE COVERED WITH A PRE-FABRICATED UV-RESISTANT PVC JACKET. (2) PRE-FABRICATED SELF-ADHERING, SHEET-TYPE WATERPROOFING MEMBRANE.

DESIGNED SPECIFICALLY FOR EXTERIOR USE. THE ENTIRE ASSEMBLY SHALL BE WEATHERPROOF (WATER IMPERMEABLE) AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS (B) ACCEPTABLE WATERPROOFING MEMBRANE PRODUCTS: FLEXCLAD 400 MANUFACTURED BY MFM BUILDING PRODUCTS CORP., VENTRUECLAD 1577 CW MANUFACTURED BY VENTURE TAPE CORP.

(A) PVC JACKET SHALL BE HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH

(A) THE MEMBRANE SHALL BE UV-RESISTANT, EXCEED A 25/50 FLAME/SMOKE RATING. AND BE

(4) ALUMINUM JACKET (A) JACKET SHALL BE 0.016" THICK SHEET ALUMINUM. 23 12 10 PIPING IDENTIFICATION

COMPOUND APPLIED TO THE WALL THREADS ONLY

ASTM D 1784, CLASS 16354-C.

A. LABEL ALL PIPING SYSTEMS WITH PIPE MARKERS INSTALLED ADJACENT TO VALVES. WHERF PIPES PASS THROUGH WALLS OR FLOORS, NEAR ALL BRANCHES AND CHANGES OF DIRECTION, AT 20 FEET INTERVALS ON STRAIGHT RUNS OF PIPE, AND AT ACCESS DOOR LOCATIONS. ALL PIPE MARKERS SHALL CONFORM TO ANSI A13.1 "SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS". 23 12 20 PIPE HANGERS, SUPPORTS AND INSTALLATION:

SPRINGING OR FORCING. SUFFICIENT OFFSETS, PIPE LOOPS, OF EXPANSION JOINTS BETWEEN ANCHOR POINTS SHALL BE PROVIDED AS NEEDED, WHETHER OR NOT SHOWN, TO LIMIT STRESSES AND CONTROL MOVEMENT OF PIPING SUBJECT TO THERMAL EXPANSION. B. PIPE TO BE THREADED SHALL BE CUT SOUARE AND FULL THREADED WITH CLEAN-CUT TAPERING THREADS AND SHALL BE REAMED AFTER THREADING. ALL THREADED CONNECTIONS SHALL BE MADE WITH PIPE

A. PIPING SHALL BE CUT ACCURATELY TO MEASUREMENT AT THE SITE AND WORKED INTO PLACE WITHOUT

C. THE EDGES OF THE PIPE TO BE WELDED SHALL BE MACHINE BEVELED WHEREVER POSSIBLE. BEFORE WELDING, THE SURFACES SHALL BE THOROUGHLY CLEANED. THE PIPING SHALL BE CAREFULLY ALIGNE NO METAL SHALL PROJECT WITHIN THE PIPE. MITERED JOINTS ARE PROHIBITED, ONLY FACTORY FORMED FITTINGS SHALL BE USED. FLANGES SHALL BE WELDING NECK TYPE. MITERING OF THE PIPE TO FORM ELBOWS OR NOTCHING OF PIPE TO FORM TEES SHALL NOT BE PERMITTED. D. UNIONS OR FLANGES SHALL BE INSTALLED IN ALL CONNECTIONS TO EQUIPMENT, CONTROL VALVES, ETC

AS NECESSARY TO PERMIT REMOVAL OF FOUIPMENT AND SPECIALTIES FOR SERVICING, REPAIRING, OR

CLEANING. IT SHALL BE POSSIBLE TO REMOVE ANY PIECE OF EQUIPMENT BE REMOVING ONLY ONE OR

E. VALVES SHALL BE IN SUITABLE LOCATIONS AT EACH PIECE OF EQUIPMENT OR SECTION OF PIPING AS INDICATED OR REQUIRED FOR PROPER AND SAFE OPERATION OF EQUIPMENT AND TO FACILITATE MAINTENANCE AND/OR REMOVAL OF ALL EQUIPMENT. ON HORIZONTAL PIPE RUNS, INSTALL ALL VALVE STEMS VERTICALLY WHERE POSSIBLE. IN NO CASE SHALL THE STEMS BE TURNED MORE THAN 90° FROM F. TAPS (HALF COUPLINGS OR TEES) SHALL BE PROVIDED AS NECESSARY TO PERMIT THE INSTALLATION OF TEMPERATURE CONTROL SENSORS, THERMOMETERS, PRESSURE GAUGES, AIR VENTS, ETC.

G. CONNECTIONS BETWEEN COPPER PIPING AND SCREWED FERROUS PIPING OR EQUIPMENT CONNECTIONS (1) FOR PIPE AND STATIONARY NON-ROTATING, NON VIBRATING EQUIPMENT CONNECTIONS - 4" LONG (2) FOR ROTATING OR VIBRATING EQUIPMENT CONNECTIONS - CAST BRASS ADAPTER AND BRONZE FLANGES WITH DIELECTRIC SEPARATION OF FLANGES AND BOLTS H. CONNECTION BETWEEN COPPER PIPING AND FLANGED FERROUS PIPING OR EOUIPMENT CONNECTIONS

SHALL BE MADE USING BRONZE COMPANION FLANGE WITH DIELECTRIC SEPARATION OF FLANGES AND

I. BRASS OR BRONZE VALVES IN FERROUS PIPING REQUIRE DIELECTRIC SEPARATION. J. ANY PIPING RESTING ON OR COMING IN CONTACT WITH BUILDING STRUCTURE SHALL BE INSULATED AT THAT POINT TO PREVENT THE TELEGRAPHING OF SOUND. K. PIPING SYSTEMS SHALL BE SUPPORTED AT INTERVALS AS REOUIRED BY CODE. RISER CLAMPS, CLEVIS HANGERS, SWIVEL LOOP HANGERS, OR TRAPEZE HANGERS MAY BE USED. ALL HANGERS, BRACKETS, CLAMPS, ETC., SHALL BE OF STANDARD WEIGHT STEEL, PERFORATED STRAP HANGERS SHALL NOT BI USED IN ANY WORK. CLAMPS AND HANGERS IN DIRECT CONTACT WITH THE PIPE SHALL MATCH THE MATERIAL OF THE PIPE. HANGERS FOR INSULATED PIPING SYSTEMS SHALL NOT BE IN DIRECT CONTACT WITH THE PIPE. HANGERS FOR INSULATED PIPING SYSTEMS SHALL BE OVERSIZED TO ACCOMMODATE

PROVIDE MACHINE CUT STEEL PIPE SLEEVES 1" LARGER THAN OUTSIDE DIAMETER OF PIPE. WHERE FLOORS OR WALLS ARE CORE DRILLED, STEEL SLEEVES ARE NOT REQUIRED. EXTEND SLEEVES 4" HIGHER THAN FLOOR IN MECHANICAL ROOMS AND ALL ROOMS CONTAINING FLOOR DRAINS. SEAL OPENINGS TO MAINTAIN THE INTEGRITY OF THE FIRE RATIN

WOOD BLOCK INSERT. INSULATION VAPOR BARRIER SHALL BE CONTINUOUS AT EACH HANGER.

THE INSULATION AND SHALL INCLUDE AN INSULATION PROTECTION SHIELD WITH CALCIUM SILICATE OR

M. PROVIDE ALL INSERTS, FASTENERS AND SUPPORTS TO PROPERLY SUPPORT AND RETAIN PIPING: TO CONTROL EXPANSION, CONTRACTION, ANCHORAGE, DRAINAGE, AND PREVENT SWAY AND VIBRATION. PIPING SHALL BE SO SUPPORTED AS NOT TO PLACE A STRAIN ON VALVES, FIXTURES OR EQUIPMENT. N. THE DRAWINGS INDICATE THE GENERAL LOCATION AND ARRANGEMENT OF THE PIPING SYSTEMS. SO FAR AS PRACTICAL, INSTALL PIPING AS INDICATED, MAKING FINAL CONNECTIONS TO ALL EQUIPMENT AND FIXTURES. INSTALL PIPING AS DIRECT AS POSSIBLE AVOIDING UNNECESSARY OFFSETS. HOWEVER, IF OFFSETS ARE REQUIRED IN ORDER TO OBTAIN MAXIMUM HEADROOM OR TO AVOID CONFLICT WITH OTHER WORK, THEY SHALL BE MADE AS REQUIRED OR AS REQUESTED BY THE ARCHITECT/ENGINEE WITHOUT ADDITIONAL COST TO THE OWNER. THE ARCHITECT/ENGINEER RESERVES THE RIGHT TO MAKE MINOR CHANGES IN THE LOCATION OF PIPING AND EQUIPMENT DURING THE ROUGHING-IN, WITHOUT

O. INSTALL PIPING FREE OF SAGS OR BENDS. P ALL HYDRONIC PIPING SYSTEMS MUST BE INSTALLED SO THEY CAN BE COMPLETELY DRAINED. PROVIDE TEE FITTING WITH BALL VALVE WITH CAPPED HOSE THREAD FITTING AT ALL LOW POINTS, TRAPPED SECTIONS, BASES OF RISERS, AND ON EQUIPMENT SIDE OF SHUT OFF VALVES TO PERMIT DRAINING. ALL DRAIN VALVES SHALL BE ACCESSIBLE.

Q. INSTALL BALL VALVE AIR VENTS AT ALL HIGH POINTS IN THE PIPING SYSTEMS NEEDED FOR COMPLETE AIR

CONNECTIONS. ALL AIR VENTS SHALL BE ACCESSIBLE. PROVIDE 3/8" SOFT COPPER TUBING ON OUTLET

MAINS SHALL BE TAKEN FROM THE BOTTOM OF THE MAIN AND PROVIDED WITH AT LEAST THREE ELBOWS

ELIMINATION FROM THE SYSTEM. INSTALL AIR VENTS ON THE HIGH SIDE OF ALL EQUIPMENT

ADDITIONAL COST TO THE OWNER. ALL CHANGES PROPOSED BY OTHERS SHALL BE APPROVED BY THE

OF AIR VENT VALVES TURNED 180 DEGREES DOWNWARD TO DISCHARGE CLEAR OF PIPE AND INSULATION. R. PROVIDE ALL STOPS, SUPPLIES, TRAPS, ESCUTCHEONS, CARRIERS, ETC. REQUIRED FOR A COMPLETE S. WHERE HYDRONIC LINES ARE REDUCED IN SIZE, ECCENTRIC REDUCING FITTINGS SHALL BE USED TO ALIGN TOP OF MAINS AND PREVENT AIR POCKETS.

T. BRANCH HEATING WATER CONNECTIONS FROM MAINS TO RISERS, RADIATION OR EQUIPMENT BELOW

FOR EXPANSION. SUPPLY RUN-OUTS SHALL PITCH DOWN AWAY FROM MAIN 1 INCH IN 5'-0". RETURN RUN-OUTS SHALL PITCH UP TO MAIN 1 INCH IN 5'-0". U. BRANCH HEATING WATER CONNECTIONS FROM MAINS TO RISERS, RADIATION OR EQUIPMENT ABOVE MAINS SHALL BE TAKEN FROM THE TOP OF MAIN AND PROVIDED WITH AT LEAST THREE ELBOWS FOR FXPANSION. SUPPLY RUN-OUTS SHALL PITCH UP AWAY FROM MAIN 1 INCH IN 5'-0". RETURN RUN-OUTS SHALL PITCH DOWN TO MAIN 1 INCH IN 5'-0".

V. PROVIDE A SHUT-OFF VALVE IN THE SUPPLY TO EACH HEATING COIL, FINNED TUBE RADIATOR OR UNIT

HEATER AND A BALANCING VALVE IN THE RETURN LINE. PROVIDE AN ADDITIONAL SHUT-OFF VALVE IN

(1) DESCRIPTION: ALIGNMENT GUIDES SHALL BE CONSTRUCTED OF STEEL, FACTORY FABRICATED, WITH

W III AND FM COMPLIANCE: HANGERS SUPPORTS AND COMPONENTS SHALL BE LISTED AND LABELED BY III. AND FM WHERE USED FOR FIRE PROTECTION PIPING SYSTEMS. SUPPORT FIRE PROTECTION SYSTEMS PIPING INDEPENDENTLY FROM OTHER PIPING SYSTEMS. 23 12 21 PIPE GUIDES AND PIPE ANCHORS

A. ALIGNMENT GUIDES

BOLTED TWO-SECTION OUTER CYLINDER AND BASE FOR ALIGNMENT OF PIPING AND TWO-SECTION GUIDING SPIDER FOR BOLTING TO PIPE. (2) ACCEPTABLE MANUFACTURERS: ADSCO MANUFACTURING, LLC.; ADVANCED THERMAL SYSTEMS, INC.; FLEX-HOSE CO., INC.: FLEXICRAFT INDUSTRIES: FLEX-WELD, INC.: HYSPAN PRECISION PRODUCTS. INC.; METRAFLEX, INC.; PIPING TECHNOLOGY & PRODUCTS, INC.; SENIOR FLEXONICS, INC.; PATHWAY B. MATERIALS FOR ANCHORS (1) STEEL SHAPES AND PLATES: ASTM A 36/A 36M.

23 13 40 REFRIGERATION PIPING, VALVES AND SPECIALTIES

WITH ASHRAE STANDARD 15.

SUCTION RISERS AND TRAPS AS REOUIRED.

OPERATION. PROVIDE FULL OPERATING CHARGE.

E. GENERAL INSTALLATION REQUIREMENTS

(2) BOLTS AND NUTS: ASME B18.10 OR ASTM A 183, STEEL, HEX HEAD. (3) WASHERS: ASTM F 844, STEEL, PLAIN, FLAT WASHERS.

(4) MECHANICAL FASTENERS: INSERT-WEDGE-TYPE STUD WITH EXPANSION PLUG ANCHOR FOR USE IN HARDENED PORTLAND CEMENT CONCRETE, AND TENSION AND SHEAR CAPACITIES APPROPRIATE FOR

(A) STUD: THREADED, ZINC-COATED CARBON STEEL. (B) EXPANSION PLUG: ZINC-COATED STEE (C) WASHER AND NUT: ZINC-COATED STEEL.

C. EXPANSION-JOINT INSTALLATION (1) INSTALL EXPANSION JOINTS OF SIZES MATCHING SIZE OF PIPING IN WHICH THEY ARE INSTALLED. INSTALL EXPANSION JOINTS AND ALIGNMENT GUIDES TO ALLOW EXPANSION AND TO AVOID END-LOADING AND TORSIONAL STRESS. D. PIPE BEND AND LOOP INSTALLATION

(1) INSTALL PIPE BENDS AND LOOPS COLD-SPRUNG IN TENSION OR COMPRESSION AS REQUIRED TO PARTLY ABSORB TENSION OR COMPRESSION PRODUCED DURING ANTICIPATED CHANGE IN (2) ATTACH PIPE BENDS AND LOOPS TO ANCHORS. ATTACH BY WELDING. COMPLY WITH ASME B31.9 AND ASME BOILER AND PRESSURE VESSEL CODE: SECTION IX, "WELDING AND BRAZING OUALIFICATIONS."

E. ALIGNMENT-GUIDE INSTALLATION (1) INSTALL GUIDES ON PIPING ADJOINING PIPE EXPANSION FITTINGS AND LOOPS. ATTACH GUIDES TO PIPE AND SECURE TO BUILDING STRUCTURE.

F. ANCHOR INSTALLATION (1) INSTALL ANCHORS AT LOCATIONS TO PREVENT STRESSES FROM EXCEEDING THOSE PERMITTED BY ASME B31.9 AND TO PREVENT TRANSFER OF LOADING AND STRESSES TO CONNECTED EQUIPMENT

(2) FABRICATE AND INSTALL STEEL ANCHORS BY WELDING STEEL SHAPES, PLATES, AND BARS TO PIPING AND TO STRUCTURE. COMPLY WITH ASME B31.9 AND AWS D1.1. (3) INSTALL PIPE ANCHORS ACCORDING TO EXPANSION-JOINT MANUFACTURER'S WRITTEN INSTRUCTIONS IF EXPANSION JOINTS ARE INDICATED.

(1) REFRIGERANT PIPING SHALL BE TYPE "ACR" HARD DRAWN SEAMLESS COPPER TUBE WITH WROUGHT COPPER BRAZED JOINT FITTINGS. BRAZING FILLER METAL SHALL CONFORM TO AWS STANDARD A5.8 -FILLER METALS FOR BRAZING.

(1) SHUT-OFF VALVES: ANGLE PATTERN OR STRAIGHT THROUGH DESIGN, CAST BRONZE BODY WITH CAST BRONZE OR FORGED BRASS WING CAP AND BOLTED BONNECT, REPLACEABLE RESILIENT SEAT DISC, PLATED STEEL STEM, SOLDER ENDS, CAPABLE OF BEING REPACKED UNDER PRESSURE, 450 PSIG WORKING PRESSURE, 275 °F OPERATING TEMPERATURE. (2) SOLENOID VALVES: TWO-WAY STRAIGHT THROUGH DESIGN, FORGED BRASS, TEFLON VALVE SEAT, SOLDER ENDS, 400 PSIG WORKING PRESSURE, 250 °F OPERATING TEMPERATURE. FURNISH

COMPLETE WITH NEMA 1 SOLENOID ENCLOSURE WITH ½ INCH CONDUIT ADAPTER, 24 VOLT, 60 HZ NORMALLY CLOSED HOLDING COIL AND MANUAL OPERATOR TO OPEN VALVE. (3) THERMOSTATIC EXPANSION VALVE: THERMOSTATIC ADJUSTABLE MODULATING TYPE, COMPLETE WITH SENSING BULB, DISTRIBUTOR WITH SIDE CONNECTION FOR HOT GAS BYPASS LINE AND EXTERNAL EQUALIZER LINE, SOLDER ENDS. SIZE AS REQUIRED FOR SPECIFIC REQUIREMENTS AND FACTORY SET FOR PROPER EVAPORATOR SUPERHEAT REQUIREMENTS.

C. SPECIALTIES (1) FILTER-DRIER: STEEL SHELL, STEEL FLANGE RING, STEEL SPRING, DUCTILE IRON COVER PLATE WITH STEEL CAPSCREWS, WROUGHT COPPER SOLDER ENDS, 500 PSIG OPERATING PRESSURE. FURNISH COMPLETE WITH REPLACEABLE FILTER-DRIER CORE KIT, INCLUDING GASKETS AND STANDARD CAPACITY DESICCANT SIEVES TO PROVIDE MICRONIC FILTRATION. (2) SIGHT GLASS: FORGED BRASS BODY, REPLACEABLE POLISHED OPTICAL VIEWING WINDOW, SOLDER ENDS, 500 PSIG OPERATING PRESSURE, AND 200 °F OPERATING TEMPERATURI

(3) FLEXIBLE CONNECTORS: SEAMLESS TIN BRONZE OR STAINLESS STEEL CORE, HIGH TENSILE BRONZE

BRAID COVERING WITH SYNTHETIC COVERING, FACTORY PRESSURE TESTED, MINIMUM 7 INCH

LENGTH, SOLDER ENDS, 500 PSIG OPERATING PRESSURE (1) REFRIGERANT R-134 (AIR HANDLING UNITS) AND R-410 (DUCTLESS A/C UNITS) IN ACCORDANCE

(1) PIPING AND SPECIALTIES SHALL BE SIZED TO PREVENT EXCESSIVE PRESSURE DROP AND ALLOW COMPRESSORS AND EVAPORATORS TO OPERATE TOGETHER WITH BALANCE POINTS AT OR ABOVE THE (2) PIPING AND SPECIALTIES SHALL BE ARRANGED TO RETURN OIL AT ALL LOADS AND PREVENT LIQUID FROM "SLUGGING" THE COMPRESSOR OR SIPHONING TO THE EVAPORATOR. PROVIDE DOUBLE

(3) PITCH HORIZONTAL REFRIGERANT PIPING 1/2 INCH PER 10 FEET IN DIRECTION OF FLOW. (4) PROVIDE SEPARATE REFRIGERANT CIRCUITS FOR MULTIPLE COMPRESSOR APPLICATIONS. (5) ALL REFRIGERANT PIPING SHALL BE ASSEMBLED WITH BRAZED JOINTS. CONTINUOUSLY PURGE

JOINTS WHILE BEING BRAZED WITH OIL-FREE DRY NITROGEN TO PREVENT THE FORMATION OF SCALE

(6) INSTALL STRAINERS IMMEDIATELY AHEAD OF EACH THERMOSTATIC EXPANSION VALVE, SOLENOID VALVE AND AS REQUIRED TO PROTECT REFRIGERATION PIPING SYSTEM COMPONENTS. (7) INSTALL UNIONS TO ALLOW REMOVAL OF THERMOSTATIC EXPANSION VALVES AND SOLENOID VALVES AND AT CONNECTIONS TO COMPRESSORS AND EVAPORATORS. (8) INSTALL FLEXIBLE CONNECTORS AT THE INLET AND DISCHARGE CONNECTIONS OF COMPRESSORS.

(9) INSTALL PRESSURE REGULATING AND RELIEVING VALVES AS REQUIRED BY ASHRAE STANDARD 15

SHALL CONFORM TO "PRESSURE PIPING CODE" 4101:8-3 AND ANSI STANDARD B31.5 "REFRIGERANT

(10)REFRIGERANT SYSTEM PIPING LAYOUT AND SIZING SHALL BE APPROVED BY THE EQUIPMENT (1) TEST REFRIGERANT PIPING WITH OIL-FREE PUMPED DRY NITROGEN. TWENTY FOUR HOUR STANDING TIME MINIMUM. TEST LOW SIDE OF THE SYSTEM TO 150 PSI AND HIGH SIDE TO 300 PSI. TESTS

AND THE SAFETY CODE FOR MECHANICAL REFRIGERATION (ANSI B9.1).

A. FURNISH AND INSTALL DUCTWORK, HANGERS, DAMPERS, GRILLES, REGISTERS, DIFFUSERS AND RELATED SHEET METAL ACCESSORIES AS SHOWN ON THE DRAWINGS AND AS INDICATED IN THESE

B. ALL SHEET METAL SHALL BE FABRICATED IN ACCORDANCE WITH REQUIREMENTS OF THE SMACNA

(2) EVACUATE AND CHARGE SYSTEM WITH REFRIGERANT AS REQUIRED TO PLACE EQUIPMENT IN

PRESSURE CLASSIFICATION INDICATED IN THE DRAWINGS. DUCT SHALL BE FABRICATED OF NO. 1 PRIME GALVANIZED SHEET METAL. EVIDENCE OF ANY SEPARATION OF GALVANIZED SURFACE FROM THE STEEL AT ANY POINT OF THE DUCTWORK SHALL BE CONSIDERED SUFFICIENT CAUSE TO REJECT THIS MATERIAL . SEALING MATERIALS SHALL BE SUITABLE FOR USE WITH AIR DISTRIBUTION DUCTWORK. ACCEPTABLE MANUFACTURERS ARE MONOCO INDUSTRIES, 3M, PR UNITED SHEET METAL

D. PROVIDE ALL DUCTWORK AS INDICATED ON THE DRAWINGS, MAKING ALL NECESSARY OFFSETS

(WHETHER OR NOT SPECIFICALLY INDICATED) AS REQUIRED TO MEET THE VARIOUS BUILDING

CONDITIONS. DUCTWORK INSTALLATION SHALL NOT CONFLICT WITH EQUIPMENT OR PIPING.

E. ALL CHANGES IN CROSS SECTION SHALL BE MADE WITHOUT REDUCING THE DESIGN AREA OF THE DUCT. F. NO PIPE OR OTHER OBSTRUCTIONS SHALL PASS THROUGH AIR DUCT G. CAP ALL OPEN ENDS OF DUCTWORK DURING CONSTRUCTION TO PREVENT ENTRANCE OF DUST, DEBRIS,

H. INSTALL DUCTWORK RUN ABOVE CEILING SO AS TO MAINTAIN DESIGN CEILING HEIGHTS. EXPOSED

 DUCTWORK SHALL NOT BE HUNG FROM EQUIPMENT, PIPING, CONDUIT, OR OTHER DUCTWORK ALL DUCTWORK JOINTS AND SEAMS SHALL BE AIR-TIGHT. POORLY MADE JOINTS. SPLITS. VISIBLE HOLES AT CORNERS, ETC. SHALL BE REWORKED AND REPAIRED WHERE EXCESSIVE PULSATING OF DUCTWORK IS FOUND, ADDITIONAL STIFFENERS SHALL BE ADDED. ANY CRACKING IN THE SEALANT THAT IS APPARENT UPON INSPECTION SHALL BE SUFFICIENT TO WARRANT REJECTION. K. IF THE INTERIOR OF SHEET METAL IS EXPOSED TO VIEW THROUGH AIR DISTRIBUTION DEVICES IN

DUCTWORK SHALL BE INSTALLED TO PROVIDE MAXIMUM HEADROOM

L. ALL DUCTWORK SHALL BE SUPPORTED PER SMACNA REQUIREMENTS.

CHANGE OF DIRECTION PER SECTION.

Q. INSTALLATION OF DUCTWORK, HARDWARE AND ACCESSORIES:

SERVICE AND MAINTENANCE

O. DUCTWORK PRESSURE CLASSIFICATION

M. RECTANGULAR DUCTWORK FITTINGS (1) BRANCH CONNECTIONS SHALL BE 45 DEGREES ENTRY. STRAIGHT TAPS ARE NOT PERMITTED (2) CHANGES IN DIRECTION, OF ALL RECTANGULAR DUCTWORK, SHALL BE MADE WITH FULL RADIUS ELBOWS WITH RADIUS EQUAL TO 1-1/2 TIMES THE HORIZONTAL WIDTH OF THE DUCT, OR WITH SQUARE ELBOWS WITH TURNING VANES. TURNING VANES SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE SURROUNDING DUCTWORK AND TWO (2) GAUGE NUMBERS HEAVIER.

INISHED AREAS OF THE BUILDING, IT SHALL BE COATED WITH PRIMER AND A FLAT BLACK FINISH COAT.

N. ROUND DUCTWORK FITTINGS: (1) FABRICATE ROUND DUCTS OF SMACNA 2" W.G. PRESSURE CLASSIFICATION WITH SPIRAL SEAM. GROOVED SEAM OR SNAPLOCK SEAM CONSTRUCTION. FABRICATE ROUND DUCTS OF 6" W.G. PRESSURE CLASSIFICATION WITH SPIRAL LOCK-SEAM CONSTRUCTION OR FUSION-WELDED BUTT SEAM FOR LONGITUDINAL SEAM DUCT. COMPLY WITH THE LATEST EDITION OF SMACNA "HVAC DUC" CONSTRUCTION STANDARDS" FOR GALVANIZED STEEL GALIGES. NINETY DEGREE ROLIND DUCT. BRANCHES AND FORTY-FIVE DEGREE LATERALS SHALL BE MADE WITH CONICAL LATERALS AND NINETY DEGREE CONICAL TEES SHALL BE FABRICATED TO CONFORM TO SMACNA "HVAC DUCT CONSTRUCTION STANDARDS." AND FIGURE 3-5 AND WITH METAL THICKNESSES SPECIFIED FOR LONGITUDINAL SEAM STRAIGHT DUCT. ALL DIVERGING-FLOW ROUND DUCT FITTINGS SHALL BE FABRICATED WITH A REDUCED ENTRANCE TO BRANCH TAPS WITH NO EXCESS MATERIAL PROJECTING FROM THE BOD' INTO BRANCH TAP ENTRANCE. FABRICATE ROUND DUCT IN STAMPED OR FIVE-GORED SEGMENTED ELBOWS 1.5 TIMES THE ELBOW DIAMETER. SEGMENTED ELBOWS SHALL NOT EXCEED 20 DEGREE

(1) ALL SHEET METAL SHALL BE FABRICATED OF THICKNESS NOT LESS THAN REQUIRED BY SMACNA FOR THE PRESSURE CLASSIFICATION INDICATED, OR WHERE NOT INDICATED AS REQUIRED FOR SMACNA 2' W.G. PRESSURE CLASSIFICATION. (2) ALL SUPPLY AIR DUCTWORK INSTALLED UPSTREAM OF VAV TERMINAL BOXES AND FAN POWERED FERMINAL BOXES SHALL BE CONSTRUCTED PER SMACNA STANDARDS FOR MINIMUM 6 INCH WATER GAUGE DUCT PRESSURE CLASSIFICATION.

POLYMERIZED BUTYL SEALANT COMPLYING WITH FS TT-S-001657, TYPE I; FORMULATED WITH A MINIMUM

OF 70 PERCENT SOLIDS OR APPROVED EQUAL AS MANUFACTURED BY MONOCO INDUSTRIES, SPECSEAL,

3M, OR UNITED SHEET METAL. SEAL ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS OF SUPPLY AIR DUCTWORK, SEAL AND PRESSURE TEST EXTERNALLY INSULATED DUCTS PRIOR TO INSULATION INSTALLATION WITH TWO COATS OF SEALANT.

WITH OTHER WORK. INSTALL REGULATORS ON ALL BALANCING (VOLUME) DAMPERS.

P. DUCTWORK JOINT AND SEAM SEALANT SHALL BE ONE PART, NON-SAG SOLVENT-RELEASE-CURING

(1) INSTALL BALANCING VOLUME DAMPERS AS INDICATED ON DRAWINGS: AS CLOSE TO THE MAIN DUCT AS POSSIBLE AND AS FAR FROM DIFFUSERS, REGISTERS OR GRILLES AS POSSIBLE. INSTALL BALANCING DAMPERS AT AN ACCESSIBLE LOCATION (2) INSTALL DUCTWORK ACCESSORIES IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTION, WITH APPLICABLE PORTIONS OF DETAILS OF CONSTRUCTION AS SHOWN IN SMACNA STANDARDS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE INTENDED FUNCTION. COORDINATE WITH OTHER WORK, INCLUDING CEILING AND DUCTWORK, AS NECESSARY TO INTERFACE INSTALLATION OF DUCTWORK ACCESSORIES PROPERLY

(3) DUCT-MOUNTED SMOKE DETECTORS: (A) DUCT-MOUNTED SMOKE DETECTORS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AND MOUNTED IN THE DUCT BY THE HVAC CONTRACTOR (B) ELECTRICAL CONTRACTOR SHALL COORDINATE THE MOUNTING LOCATION OF THE SMOKE DETECTOR WITH THE HVAC CONTRACTOR, EXACT LOCATION SHALL BE DETERMINED BY THE HVAC CONTRACTOR, LOCATION SHALL BE IN ACCORDANCE WITH NFPA 72 AND THE SMOKE DETECTOR

(C) IF THE DETERMINED SMOKE DETECTOR LOCATION REQUIRES ADDITIONAL MOUNTING PROVISION TO PERMIT PROPER INSTALLATION, THE PROVISIONS SHALL BE PROVIDED AND INSTALLED BY THE HVAC CONTRACTOR. MINIMUM DUCT SIZES FOR INSTALLATION OF DUCT SMOKE DETECTOR ARE TYPICALLY 18" FOR ROUND AND 8" SQUARE FOR RECTANGULAR. PROVIDE TRANSITIONS TO SECTIONS THAT MEET THESE MINIMUM REQUIREMENTS. VERIFY REQUIREMENTS WITH ACTUAL **DUCT DETECTOR BEING FURNISHED BY DIVISION 26**

MANUFACTURER'S REOUIREMENTS. SMOKE DETECTOR LOCATION MUST BE ACCESSIBLE FOR

PATRICK W. NUMBER 29264 8-15-2025

Lee's Summit, Missouri

RELEASED FOR

As Noted on Plans Review

275 Springside Dr., Suite 300 Akron, Ohio 44333 Phone: 330-666-3702

ptaengineering.com

740 MARKS ROAD - SUITE A, VALLEY CITY, OHIO 44208

PROJECT:

ISSUED

PROJECT#: 016-0402

DRAWING TITLE:

MECHANICAL

SPECIFICATIONS

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08/15/2025

MECHANICAL SPECIFICATIONS (CONTINUED)

23 20 20 FLEXIBLE DUCTWORK R. THE LAST 36" HORIZONTAL OR VERTICAL CONNECTION TO EACH DIFFUSER MAY BE MADE OF 4" PRESSURE

CLASS FLEXIBLE DUCT WITH EXTERIOR FIBERGLASS INSULATION. S. ACCEPTABLE MANUFACTURERS: ATCO - TYPE UPC 070, CLEVAFLEX - TYPE KQ, OR FLEXMASTER - TYPE 1B. 23 21 10 DUCTWORK INSULATION

T. EACH CONTRACTOR SHALL FURNISH AND INSTALL ALL INSULATION NECESSARY TO THE PROJECT AND IN ACCORDANCE WITH THE FOLLOWING SCHEDULE. ALL INSULATION AND ACCESSORIES USED SHALL HAVE A COMPOSITE (INSULATION, JACKET AND ADHESIVE) FIRE AND SMOKE HAZARD RATING AS TESTED UNDER PROCEDURE ASTM E-84, NFPA 255 AND UL 723, NOT EXCEEDING A FLAME SPREAD 25 AND SMOKE DEVELOPED 50. INSULATION SHALL BE RATED FOR INSTALLATION IN PLENUM CEILINGS. U. MATERIALS:

(1) ALL INSULATION WORK SHALL BE INSTALLED WHERE INDICATED IN THE INSULATION SCHEDULE AND SHALL BE OF THE THICKNESS AND MATERIALS CONFORMING WITH THE INSULATION SCHEDULE.

V. ACCEPTABLE MANUFACTURERS FOR FIBERGLASS INSULATION PRODUCTS: OWENS CORNING, KNAUF, CERTAIN TEED, OR JOHNS MANVILLE. W. ACCEPTABLE MANUFACTURERS FOR CLOSED-CELL ELASTOMERIC AND POLYMERIC INSULATION PRODUCTS:

AEROCEL, ARMACELL, HALSTEAD, NOMACO, OR RUBATEX. X IN ADDITION TO THE INSULATION AND NORMAL FINISH ALL OUTDOOR PIPING SHALL BE COVERED WITH A PRE-FABRICATED SELF-ADHERING, SHEET-TYPE WATERPROOFING MEMBRANE. THE MEMBRANE SHALL BE UV-RESISTANT, EXCEED A 25/50 FLAME/SMOKE RATING, AND BE DESIGNED SPECIFICALLY FOR EXTERIOR USE. THE ENTIRE ASSEMBLY SHALL BE WEATHERPROOF (WATER IMPERMEABLE) AND INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

(1) ACCEPTABLE WATERPROOFING MEMBRANE PRODUCTS: FLEXCLAD 400 MANUFACTURED BY MFM BUILDING PRODUCTS CORP., VENTRUECLAD 1577 CW MANUFACTURED BY VENTURE TAPE CORP. 23 22 10 GRILLES AND DIFFUSERS

A. INSTALL DIFFUSERS, REGISTERS AND GRILLES IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE INTENDED FUNCTIONS. COORDINATE WITH OTHER WORK, INCLUDING DUCTWORK AND DUCT ACCESSORIES. AS NECESSARY TO INTERFACE INSTALLATION WITH OTHER WORK. LOCATE CEILING AIR DIFFUSERS, REGISTERS AND GRILLES AS INDICATED ON GENERAL CONSTRUCTION "REFLECTED CEILING PLANS." UNLESS OTHERWISE INDICATED, LOCATE UNITS IN CENTER OF ACOUSTICAL CEILING

B. ALL GRILLES, REGISTERS AND DIFFUSERS SHALL BE OF THE SIZES, TYPE, ETC., AS SHOWN ON THE PLAN C. ACCEPTABLE MANUFACTURERS: KRUEGER, PRICE OR TITUS.

23 22 30 MANUAL BALANCE DAMPERS

D. FURNISH AND INSTALL ALL MANUAL BALANCING DAMPERS AS SHOWN ON THE DRAWINGS OR REQUIRED O PROPERLY DISTRIBUTE THE AIR. BALANCING DAMPERS IN ROUND DUCTWORK SHALL BE OF SINGLE BLADE TYPE CONSTRUCTION, MINIMUM 18 GAUGE GALVANIZED STEEL OR DUCT GAUGE, WHICHEVER IS HEAVIER. PIVOT ROD SHAFT SHALL BE CONTINUOUS ON ALL SINGLE BLADE BALANCING DAMPERS. PROVIDE BALANCING DAMPERS IN RECTANGULAR DUCTWORK OF MULTI-BLADE (OPPOSED BLADE) TYPE CONSTRUCTION. ALL BALANCING DAMPERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA 'HVAC DUCT CONSTRUCTION STANDARDS."

E. ALL MANUAL BALANCING DAMPERS SHALL BE CONTROLLED BY VENTLOK 620/635 OR YOUNG 403 REGULATORS FOR UNINSULATED OR INTERNALLY LINED DUCTS OR BY VENTLOK 628/638 OR YOUNG 443 REGULATORS FOR EXTERNALLY WRAPPED DUCTS

F. ACCEPTABLE MANUFACTURERS FOR MULTIBLADE TYPE BALANCING DAMPERS: AIR GUIDE, ARROW UNITED, RELIABLE DAMPER, YOUNG REGULATOR, AIR BALANCE, OR GREENHECK.

A. PROVIDE LOUVERS WITH FRAME AND SILL STYLES THAT ARE COMPATIBLE WITH ADJACENT SUBSTRATE. LOUVERS SHALL BE SPECIFICALLY MANUFACTURED TO FIT INTO CONSTRUCTION OPENINGS IN THE ADJACENT SUBSTRATE WITH ACCURATE FIT AND ADEQUATE SUPPORT FOR A WEATHERPROOF INSTALLATION. CONSTRUCT LOUVERS OF EXTRUDED ALUMINUM ALLOY FRAME AND BLADES WITH ALL WELDED CONSTRUCTION. LOUVERS SHALL BE PROVIDED WITH A KYNAR FINISH. COLOR OF LOUVERS WILL BE SELECTED BY THE ARCHITECT. SUBMIT MANUFACTURERS STANDARD COLOR CHARTS FOR SELECTION. PROVIDE LOUVERS WITH ALUMINUM BIRD SCREENS.

B. ACCEPTABLE MANUFACTURERS: RUSKIN, AMERICAN WARMING AND VENTILATING, OR GREENHECK. 23 30 10 EQUIPMENT IDENTIFICATION

A. PROVIDE CLEAR STICKER ON CEILING T-BAR TO INDICATE ACCESS LOCATION FOR EACH FAN POWERED BOX AND VAV TERMINAL BOX. B. THE CONTRACTOR SHALL FURNISH AND INSTALL A SYSTEM OF NAMEPLATES OR STENCILS DESIGNED TO

(2) NAMERIATES SHALL BE LAMINATED PHENOLIC WITH BLACK SURFACE AND WHITE CORE. LISE 1/16"

IDENTIFY EACH PIECE OF EQUIPMENT (1) NAMEPLATE LETTERS AND NUMBERS SHALL MATCH EQUIPMENT DESIGNATION AS INDICATED ON THE

THICK MATERIAL FOR PLATES UP TO 2" BY 4". FOR LARGER SIZES USE 1/8" THICK. LETTERS AND NUMBERS SHALL BE A MINIMUM OF 1/2" HIGH. (3) FASTEN NAMEPLATES TO ALL EQUIPMENT BY THE USE OF STAINLESS STEEL SHEET METAL SCREWS.

A. PROVIDE DIRECT CENTRIFUGAL FANS, AS SCHEDULED, CONSISTING OF HOUSING, WHEEL, FAN SHAFT, BEARINGS, ECM, MOTOR AND DISCONNECT SWITCH, DRIVE ASSEMBLY, CURB BASE, AND ACCESSORIES. B. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP, AND OUTLET BAFFLE SQUARE, ONE-PIECE,

ALUMINUM BASE WITH VENTURI INLET CONE. C. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.

D. ACCESSORIES:

(1) DISCONNECT SWITCH: NONFUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION MOUNTED INSIDE

FAN HOUSING, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT. (2) BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE. (3) DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE;

FACTORY SET TO CLOSE WHEN FAN STOPS. E. ROOF CURBS: SHALL BE FURNISHED BY THE FAN MANUFACTURER AND SHALL BE GALVANIZED STEEL,

MITERED AND WELDED CORNERS; 1-1/2-INCH- THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN

(1) CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE (2) OVERALL HEIGHT: 14 INCHES (3) METAL LINER: GALVANIZED STEEL.

F. ACCEPTABLE MANUFACTURERS: CARNES COMPANY HVAC, GREENHECK, LOREN COOK COMPANY, NEW YORK BLOWER COMPANY, PENN VENTILATION, TWIN CITY FAN COMPANY. 23 60 10 PACKAGED ROOFTOP AIR CONDITIONING UNITS

G. GENERAL DESCRIPTION (1) PACKAGED ROOFTOP UNITS SHALL INCLUDE COMPRESSOR(S), EVAPORATOR COIL(S), FILTERS, SUPPLY FANS, DAMPERS, AIR-COOLED CONDENSER COILS, CONDENSER FANS, ELECTRIC

PRE-HEATERS, EXHAUST FANS, AND ENERGY RECOVERY WHEELS. (2) UNITS SHALL BE FACTORY ASSEMBLED AND TESTED INCLUDING LEAK TESTING OF THE COILS,

PRESSURE TESTING OF THE REFRIGERATION CIRCUIT, AND RUN TESTING OF THE COMPLETED UNIT. RUN TEST REPORT SHALL BE SUPPLIED WITH EACH UNIT IN THE CONTROLS COMPARTMENT'S

(3) UNITS SHALL HAVE DECALS AND TAGS TO INDICATE LIFTING AND RIGGING, SERVICE AREAS AND CAUTION AREAS FOR SAFETY AND TO ASSIST SERVICE PERSONNEL.

(4) UNIT COMPONENTS SHALL BE LABELED, INCLUDING PIPE STUB OUTS, REFRIGERATION SYSTEM COMPONENTS AND ELECTRICAL AND CONTROLS COMPONENTS.

(5) ESTIMATED SOUND POWER LEVELS (DB) SHALL BE SHOWN ON THE UNIT RATINGS SHEET. (6) INSTALLATION, OPERATION AND MAINTENANCE MANUAL SHALL BE SUPPLIED WITHIN EACH UNIT.

(7) LAMINATED COLOR-CODED WIRING DIAGRAM SHALL MATCH FACTORY INSTALLED WIRING AND SHALL BE AFFIXED TO THE INTERIOR OF THE CONTROL COMPARTMENT'S ACCESS DOOR. (8) UNIT NAMEPLATE SHALL BE PROVIDED IN TWO LOCATIONS ON THE UNIT, AFFIXED TO THE EXTERIOR OF THE UNIT AND AFFIXED TO THE INTERIOR OF THE CONTROL COMPARTMENT'S ACCESS DOOR.

(1) ALL CABINET WALLS, ACCESS DOORS, AND ROOF SHALL BE FABRICATED OF DOUBLE WALL, IMPACT RESISTANT, RIGID POLYURETHANE FOAM PANELS

(2) UNIT INSULATION SHALL HAVE A MINIMUM THERMAL RESISTANCE R-VALUE OF 13. FOAM INSULATION SHALL HAVE A MINIMUM DENSITY OF 2 POUNDS/CUBIC FOOT AND SHALL BE TESTED IN ACCORDANCE

WITH ASTM D-1929 FOR A MINIMUM FLASH IGNITION TEMPERATURE OF 610°F. (3) UNIT CONSTRUCTION SHALL BE DOUBLE WALL WITH G90 GALVANIZED STEEL ON BOTH SIDES AND A THERMAL BREAK, DOUBLE WALL CONSTRUCTION WITH A THERMAL BREAK PREVENTS MOISTURE ACCUMULATION ON THE INSULATION, PROVIDES A CLEANABLE INTERIOR, PREVENTS HEAT TRANSFER THROUGH THE PANEL, AND PREVENTS EXTERIOR CONDENSATION ON THE PANEL.

(4) UNITS SHALL BE DESIGNED TO REDUCE AIR LEAKAGE AND INFILTRATION THROUGH THE CABINET. CABINET LEAKAGE SHALL NOT EXCEED 1% OF TOTAL AIRFLOW WHEN TESTED AT 3 TIMES THE MINIMUM EXTERNAL STATIC PRESSURE PROVIDED IN AHRI STANDARD 340/360. PANEL DEFLECTION SHALL NOT EXCEED L/240 RATIO AT 125% OF DESIGN STATIC PRESSURE, AT A MAXIMUM 8 INCHES OF POSITIVE OR NEGATIVE STATIC PRESSURE, TO REDUCE AIR LEAKAGE. DEFLECTION SHALL BE MEASURED AT THE MIDPOINT OF THE PANEL HEIGHT AND WIDTH. CONTINUOUS SEALING SHALL BE INCLUDED BETWEEN PANELS AND BETWEEN ACCESS DOORS AND OPENINGS TO REDUCE AIR LEAKAGE. REFRIGERANT PIPING AND ELECTRICAL CONDUIT THROUGH CABINET PANELS SHALL INCLUDE SEALING

(5) ROOF OF THE UNITS SHALL BE SLOPED TO PROVIDE COMPLETE DRAINAGE. CABINET SHALL HAVE RAIN BREAK OVERHANGS ABOVE ACCESS DOORS

(6) ACCESS TO FILTERS, DAMPERS, COOLING COILS, EXHAUST FANS, RETURN FANS, ENERGY RECOVERY WHEELS, COMPRESSORS, AND ELECTRICAL AND CONTROLS COMPONENTS SHALL BE THROUGH HINGED ACCESS DOORS WITH QUARTER TURN, ZINC CAST, LOCKABLE HANDLES. FULL LENGTH STAINLESS STEEL PIANO HINGES SHALL BE INCLUDED ON THE DOORS.

(7) EXTERIOR PAINT FINISH SHALL BE CAPABLE OF WITHSTANDING AT LEAST 2,500 HOURS, WITH NO VISIBLE CORROSIVE EFFECTS, WHEN TESTED IN A SALT SPRAY AND FOG ATMOSPHERE IN ACCORDANCE WITH ASTM B 117-95 TEST PROCEDURE.

(8) UNITS WITH COOLING COILS SHALL INCLUDE DOUBLE SLOPED 304 STAINLESS STEEL DRAIN PANS. (9) UNITS SHALL BE PROVIDED FOR DOWNFLOW ARRANGEMENT WITH BASE DISCHARGE AND RETURN AIR OPENINGS. ALL OPENINGS THROUGH THE BASE PAN OF THE UNIT SHALL HAVE UPTURNED FLANGES OF AT LEAST 1/2 INCH IN HEIGHT AROUND THE OPENING.

(10)UNITS SHALL INCLUDE LIFTING LUGS TO AID IN RIGGING. ELECTRICAL

(1) UNITS SHALL BE PROVIDED WITH STANDARD POWER BLOCK FOR CONNECTING POWER TO THE UNIT. A SINGLE POWER FEED SHALL BE PROVIDED FOR EACH UNITS SUPPLY FAN. RETURN/EXHAUST FAN. ENERGY RECOVERY WHEEL, CONTROLS AND REFRIGERATION COMPONENTS, INCLUDING COMPRESSORS AND CONDENSER FANS. UNITS SHALL BE PROVIDED WITH A FACTORY INSTALLED AND FACTORY WIRED, NON-FUSED DISCONNECT SWITCH FOR ALL OF THIS EQUIPMENT.

(2) UNITS SHALL BE PROVIDED WITH A SEPARATE POWER FEED FOR THE ELECTRIC PRE-HEAT COILS. (1) UNITS SHALL INCLUDE DIRECT DRIVE, UNHOUSED, BACKWARD CURVED, PLENUM SUPPLY FANS.

(3) MOTORS SHALL BE PREMIUM EFFICIENCY ODP WITH BALL BEARINGS RATED FOR 200,000 HOURS SERVICE WITH EXTERNAL LUBRICATION POINTS (4) UNITS SCHEDULED TO BE VARIABLE AIRFLOW SHALL BE PROVIDED WITH VARIABLE FREQUENCY DRIVES TO SERVE SUPPLY FANS. VARIABLE FREQUENCY DRIVES (VFD) SHALL BE FACTORY WIRED AND MOUNTED IN THE UNIT. FAN MOTORS SHALL BE PREMIUM EFFICIENCY, COMPATIBLE WITH THE

(2) BLOWERS AND MOTORS SHALL BE DYNAMICALLY BALANCED AND MOUNTED ON RUBBER ISOLATORS.

K. POWERED EXHAUST FANS

(1) POWERED EXHAUST FANS AND DAMPERS SHALL BE SIZED FOR 100% RELIEF.

(2) FANS AND MOTORS SHALL BE DYNAMICALLY BALANCED.

(3) MOTORS SHALL BE PREMIUM EFFICIENCY ODP WITH BALL BEARINGS RATED FOR 200,000 HOURS SERVICE WITH EXTERNAL LUBRICATION POINTS.

(4) ACCESS TO EXHAUST FANS SHALL BE THROUGH DOUBLE WALL, HINGED ACCESS DOORS WITH OUARTER TURN HANDLES.

(5) POWERED EXHAUST FANS SHALL BE PROVIDED WITH VARIABLE FREQUENCY DRIVES. VARIABLE FREQUENCY DRIVES SHALL BE FACTORY WIRED AND MOUNTED IN THE UNIT. FAN MOTORS SHALL BE

L. COOLING COILS (1) EVAPORATOR COILS

> (A) COILS SHALL BE DESIGNED FOR USE WITH R-410A REFRIGERANT AND CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES AND GALVANIZED STEEL END CASINGS. FIN DESIGN SHALL BE SINE WAVE RIPPLED. FIN SPACING SHALL NOT EXCEED 10

(B) COILS FOR UNITS WITH TWO REFRIGERANT CIRCUITS SHALL HAVE INTERLACED CIRCUITRY. (C) COILS SHALL BE HELIUM LEAK TESTED. (D) COILS SHALL BE FURNISHED WITH FACTORY INSTALLED THERMOSTATIC EXPANSION VALVES.

M. REFRIGERATION SYSTEM

(1) UNITS SHALL BE FACTORY CHARGED WITH SCHEDULED REFRIGERANT. (2) COMPRESSORS SHALL BE SCROLL TYPE WITH THERMAL OVERLOAD PROTECTION, INDEPENDENTLY

CIRCUITED, AND CARRY A 5 YEAR NON-PRORATED WARRANTY. (3) COMPRESSORS SHALL BE MOUNTED IN AN ISOLATED SERVICE COMPARTMENT WHICH CAN BE ACCESSED WITHOUT AFFECTING UNIT OPERATION. LOCKABLE HINGED COMPRESSOR ACCESS DOORS SHALL BE FABRICATED OF DOUBLE WALL, RIGID POLYURETHANE FOAM INSULATED PANELS TO PREVENT THE TRANSMISSION OF NOISE OUTSIDE THE CABINET.

(4) COMPRESSORS SHALL BE ISOLATED FROM THE BASE PAN WITH THE COMPRESSOR MANUFACTURER'S RECOMMENDED RUBBER VIBRATION ISOLATORS, TO REDUCE ANY TRANSMISSION OF NOISE FROM THE COMPRESSORS INTO THE BUILDING AREA.

(5) EACH REFRIGERATION CIRCUIT SHALL BE EQUIPPED WITH THERMOSTATIC EXPANSION VALVE TYPE REFRIGERANT FLOW CONTROL. (6) EACH REFRIGERATION CIRCUIT SHALL BE EQUIPPED WITH AUTOMATIC RESET LOW PRESSURE AND MANUAL RESET HIGH PRESSURE REFRIGERANT SAFETY CONTROLS, SCHRADER TYPE SERVICE FITTINGS

FILTER DRIERS. EACH REFRIGERATION CIRCUIT SHALL BE EQUIPPED WITH A LIQUID LINE SIGHT (A) EACH REFRIGERATION CIRCUIT SHALL BE PROVIDED WITH AN ADJUSTABLE TEMPERATURE

SENSOR FREEZE STAT WHICH SHUTS DOWN THE COOLING CIRCUITS WHEN THE EVAPORATOR COIL TUBING FALLS BELOW THE SETPOINT

ON BOTH THE HIGH PRESSURE AND LOW PRESSURE SIDES, AND FACTORY INSTALLED LIQUID LINE

(B) EACH REFRIGERATION CIRCUIT SHALL BE EQUIPPED WITH SUCTION AND DISCHARGE COMPRESSOR ISOLATION VALVES.

(C) EACH CAPACITY STAGE SHALL BE EQUIPPED WITH A 5 MINUTE OFF, DELAY TIMER TO PREVENT COMPRESSOR SHORT CYCLING. (D) EACH CAPACITY STAGE SHALL BE EQUIPPED WITH AN ADJUSTABLE, 20 SECOND DELAY TIMER TO

PREVENT MULTIPLE CAPACITY STAGES FROM STARTING ALL AT ONCE. (E) UNITS SHALL INCLUDE A VARIABLE CAPACITY SCROLL COMPRESSOR(S) ON THE LEAD REFRIGERATION CIRCUIT(S) WHICH SHALL BE CAPABLE OF MODULATION FROM 10-100% OF ITS CAPACITY.

(1) AIR-COOLED CONDENSER FANS SHALL BE VERTICAL DISCHARGE, AXIAL FLOW, AND DIRECT DRIVE

(2) COILS SHALL BE DESIGNED FOR USE WITH R-410A REFRIGERANT AND CONSTRUCTED OF COPPER TUBES WITH ALUMINUM FINS MECHANICALLY BONDED TO THE TUBES AND ALUMINUM END CASINGS.

(3) COILS SHALL BE DESIGNED FOR A MINIMUM OF 10F OF REFRIGERANT SUB-COOLING. (4) COILS SHALL BE HELIUM LEAK TESTED.

FIN DESIGN SHALL BE SINE WAVE RIPPLED.

(5) CONDENSER FANS SHALL HAVE HIGH EFFICIENCY, ELECTRICALLY COMMUTATED MOTORS DRIVEN BY VARIABLE FREOUENCY DRIVES WHICH ARE CONTROLLED BASED ON HEAD PRESSURE AND ALLOW MATCHING CONDENSER AIRFLOW WITH COOLING CAPACITY REQUIREMENTS.

(1) UNITS SHALL INCLUDE 2 INCH THICK, PLEATED PANEL FILTERS WITH AN ASHRAE EFFICIENCY OF 30% AND MERV RATING OF 7, UPSTREAM OF THE ENERGY RECOVERY WHEEL IN THE RETURN AIRSTREAM AND UPSTREAM OF ELECTRIC HEATING COILS AS INDICATED. P. OUTSIDE AIR/ECONOMIZER

(1) UNITS SHALL INCLUDE 0-100% ECONOMIZER CONSISTING OF A MOTOR OPERATED OUTSIDE AIR DAMPER AND RETURN AIR DAMPER ASSEMBLY CONSTRUCTED OF EXTRUDED ALUMINUM, HOLLOW CORE, AIRFOIL BLADES WITH RUBBER EDGE SEALS AND ALUMINUM END SEALS. DAMPER BLADES SHALL BE GEAR DRIVEN AND DESIGNED TO HAVE NO MORE THAN 15 CFM OF LEAKAGE PER SQ. FT. OF DAMPER AREA WHEN SUBJECTED TO 2 INCHES W.G. AIR PRESSURE DIFFERENTIAL ACROSS THE DAMPER. DAMPER ASSEMBLY SHALL BE CONTROLLED BY SPRING RETURN SENSIBLE TEMPERATURE ACTIVATED FULLY MODULATING ACTUATOR. UNIT SHALL INCLUDE OUTSIDE AIR OPENING BIRD

SCREEN, OUTSIDE AIR HOOD WITH RAIN LIP AND BAROMETRIC RELIEF DAMPERS OR POWERED (2) WHERE INDICATED IN THE CONTROL SEQUENCES, THE ECONOMIZER SHALL BE FURNISHED WITH

RETURN AIR CO₂ OVERRIDE. Q. CONTROLS (1) EACH ROOFTOP AIR CONDITIONING UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED AND

TESTED CONTROLS. EACH UNIT'S CONTROLLER SHALL BE MICROPROCESSOR-BASED AND SHALL BE CAPABLE OF CONTROLLING ALL FEATURES AND OPTIONS OF THE UNITS AS SHOWN ON THE DRAWINGS AND INDICATED IN THE SEQUENCES OF OPERATION. CONTROLLERS SHALL BE INTERFACED WITH THE BUILDING AUTOMATION SYSTEM AS INDICATED BUT SHALL BE ALSO CAPABLE OF STAND ALONE OPERATION WITH UNIT CONFIGURATION, SETPOINT ADJUSTMENT, SENSOR STATUS VIEWING, UNIT MANAGEMENT SYSTEM. CONTROLLERS SHALL HAVE AN ONBOARD CLOCK AND CALENDAR FUNCTIONS THAT ALLOW FOR OCCUPANCY SCHEDULING. CONTROLLERS SHALL INCLUDE NON-VOLATILE MEMORY TO RETAIN ALL PROGRAMMED VALUES, WITHOUT THE USE OF AN EXTERNAL BATTERY, IN THE EVENT OF A POWER FAILURE. (2) VARIABLE AIR VOLUME CONTROLS

(A) UNITS SHALL BE EQUIPPED WITH DIGITAL SCROLL COMPRESSOR(S) ON THE LEAD REFRIGERATION CIRCUITS TO PROTECT AGAINST EVAPORATOR FROSTING AT LOW SUCTION PRESSURES AND TO PREVENT EXCESSIVE COMPRESSOR CYCLING.

(B) OUTSIDE AND RETURN AIR TEMPERATURE SENSORS SHALL BE FACTORY MOUNTED AND WIRED (OUTSIDE ARE TEMPERATURE SENSORS MUST BE FIELD INSTALLED ON UNITS WITH ELECTRIC PREHEAT COILS). SUPPLY AIR TEMPERATURE SENSOR AND SUPPLY AIR DUCT STATIC PRESSURE SENSOR SHALL BE FURNISHED WITH THE UNIT FOR FIELD INSTALLATION. (C) CONTROL OF SUPPLY AIR FLOW WITH DUCT STATIC PRESSURE CONTROL, SHALL BE VIA THE UNIT CONTROLLER, THE FACTORY INSTALLED VARIABLE FREQUENCY DRIVE, AND REMOTE SUPPLY AIR DUCT STATIC PRESSURE SENSOR.

(A) OUTSIDE AIR TEMPERATURE SENSOR SHALL BE FACTORY MOUNTED AND WIRED. SUPPLY AIR TEMPERATURE SENSOR AND SPACE TEMPERATURE SENSOR WITH TEMPERATURE SETPOINT RESET AND UNOCCUPIED OVERRIDE SHALL BE FURNISHED WITH THE UNIT FOR FIELD INSTALLATION.

(1) CURBS SHALL TO BE FULLY GASKETED BETWEEN THE CURB TOP AND UNIT BOTTOM WITH THE CURB PROVIDING FULL PERIMETER SUPPORT, CROSS STRUCTURE SUPPORT AND AIR SEAL FOR THE UNIT, CURB GASKET SHALL BE FURNISHED WITHIN THE CONTROL COMPARTMENT OF THE ROOFTOP UNIT TO

BE MOUNTED ON THE CURB IMMEDIATELY BEFORE MOUNTING OF THE ROOFTOP UNIT. (2) CURB SHALL HAVE MINIMUM 1" DEFLECTION SPRING ISOLATION.

S. ACCEPTABLE MANUFACTURERS: AAON, MAMMOTH, SEASONS 4, TEMPTROL, TRANE, DAIKIN 23 81 10 DUCTLESS, SPLIT SYSTEM AIR CONDITIONERS

(3) CONSTANT VOLUME CONTROLS

A. THE DUCTLESS, SPLIT SYSTEM AIR CONDITIONERS CONTROL SYSTEM SHALL BE DESIGNED TO MAINTAIN TEMPERATURE CONDITIONS WITHIN THE ROOM. THE DUCTLESS, SPLIT SYSTEM AIR CONDITIONERS SYSTEM SHALL BE SPLIT REFRIGERATION SYSTEM WITH THE COMPRESSOR LOCATED IN A REMOTE

B. THE EVAPORATOR SECTIONS SHALL BE SPECIFICALLY DESIGNED FOR WALL-MOUNTED INSTALLATION. CONDENSING UNITS SHALL BE DESIGNED FOR OUTDOOR INSTALLATION. C. THE INDOOR, WALL-MOUNTED UNIT SHALL BE FACTORY ASSEMBLED, WIRE AND TESTED. THE UNIT CABINET SHALL BE FORMED FROM HIGH STRENGTH MOLDED PLASTIC WITH SMOOTH FINISH, FLAT FRONT PANEL DESIGN WITH ACCESS FOR FILTER. THE UNIT SHALL CONTAIN ALL FACTORY WIRING AND INTERNAL PIPING, CONTROL CIRCUIT BOARD AND FAN MOTOR. THE UNIT, IN CONJUNCTION WITH THE

WIRED, WALL MOUNTED CONTROLLER SHALL HAVE A SELF-DIAGNOSTIC FUNCTION, 3-MINUTE TIME DELAY MECHANISM, AN AUTO RESTART FUNCTION, AND A TEST RUN SWITCH. D. THE INDOOR UNIT FAN SHALL BE DOUBLE INLET, FORWARD CURVE, AND DIRECT DRIVE WITH A SINGLE MOTOR. THE FANS SHALL BE STATICALLY AND DYNAMICALLY BALANCED AND RUN ON A MOTOR WITH PERMANENTLY LUBRICATED BEARINGS. THE INDOOR FAN SHALL CONSIST OF THREE (3) SPEEDS: LOW, MID, HI, AND AUTO. THE FAN SHALL HAVE A SELECTABLE AUTO FAN SETTING THAT WILL ADJUST THE FAN SPEED ON THE DIFFERENCE BETWEEN CONTROLLER SET-POINT AND SPACE TEMPERATURE.

E. FILTER: RETURN AIR SHALL BE FILTERED BY MEANS OF AN EASILY REMOVABLE WASHABLE FILTER F. THE EVAPORATOR COIL SHALL BE NONFERROUS CONSTRUCTION WITH PRE-COATED ALUMINUM FINS ON COPPER TUBING. A CONDENSATE PAN AND DRAIN SHALL BE PROVIDED UNDER THE COIL.

G. THE ELECTRIC POWER OF THE UNIT SHALL BE 208 VOLTS OR 230 VOLTS, 1 PHASE, 60 HERTZ AS SCHEDULED. THE POWER TO THE INDOOR UNIT SHALL BE SUPPLIED FROM THE OUTDOOR UNIT. H. THE INDOOR UNIT SHALL BE CONNECTED TO A WALL MOUNTED AND WIRED CONTROLLER TO PERFORM INPUT FUNCTIONS NECESSARY TO OPERATE THE SYSTEM. THE WIRED CONTROLLER SHALL HAVE A LARGE MULTI-LANGUAGE DOT LIQUID CRYSTAL DISPLAY AND CONSIST OF AN ON/OFF BUTTON. INCREASE/DECREASE SET TEMPERATURE BUTTONS, A HEAT/COOL/AUTO MODE SELECTOR, A TIMER MENU BUTTON, A TIMER ON/OFF BUTTON, SET TIME BUTTONS, A FAN SPEED SELECTOR, A VENTILATION BUTTON, A TEST RUN BUTTON, AND A CHECK MODE BUTTON. THE CONTROLLER SHALL HAVE A BUILT-IN

TEMPERATURE SENSOR. TEMPERATURE SHALL BE DISPLAYED IN DEGREES FAHRENHEIT I. OUTDOOR AIR-COOLED CONDENSING UNITS SHALL BE FACTORY-ASSEMBLED AND TESTED, AIR-COOLED, HORIZONTAL DISCHARGE TYPE, CONSISTING OF COMPRESSOR, CONDENSER COIL, FAN, MOTOR, REFRIGERANT RESERVOIR AND OPERATING CONTROLS. CASING SHALL BE ZINC COATED STEEL FINISHED WITH BAKED ENAMEL, COMPLETE WITH REMOVABLE PANELS FOR ACCESS TO CONTROLS AND MOUNTING HOLES IN BASE. COMPRESSOR SHALL BE HERMETICALLY SEALED, WITH BUILT-IN OVERLOADS AND VIBRATION ISOLATION.

. THE CONDENSING UNIT COMPRESSOR SHALL BE A DC TWIN-ROTOR ROTARY COMPRESSOR WITH VARIABLE SPEED INVERTER DRIVE TECHNOLOGY. THE COMPRESSOR SHALL BE DRIVEN BY THE INVERTER CIRCUIT TO CONTROL COMPRESSOR SPEED. THE COMPRESSOR SPEED SHALL DYNAMICALLY VARY TO MATCH THE ROOM LOAD FOR SIGNIFICANTLY INCREASING THE EFFICIENCY OF THE SYSTEM WHICH SHALL RESULT IN SIGNIFICANT ENERGY SAVINGS. TO PREVENT LIOUID FROM ACCUMULATING IN THE COMPRESSOR DURING THE OFF CYCLE, A MINIMAL AMOUNT OF CURRENT SHALL BE AUTOMATICALLY, INTERMITTENTLY APPLIED TO THE COMPRESSOR MOTOR WINDINGS TO MAINTAIN SUFFICIENT HEAT TO VAPORIZE ANY REFRIGERANT. NO CRANKCASE HEATER IS TO BE USED. THE OUTDOOR CONDENSING UNIT SHALL HAVE AN ACCUMULATOR AND HIGH PRESSURE SAFETY SWITCH. THE COMPRESSOR SHALL BE MOUNTED TO AVOID THE TRANSMISSION OF VIBRATION.

K. THE L-SHAPED CONDENSER COIL SHALL BE OF COPPER TUBING WITH FLAT ALUMINUM FINS. THE COIL SHALL BE PROTECTED WITH AN INTEGRAL METAL GUARD. REFRIGERANT FLOW FROM THE CONDENSER SHALL BE CONTROLLED BY MEANS OF AN ELECTRONIC LINEAR EXPANSION VALVE (LEV) METERING DEVICE. THE LEV SHALL BE CONTROLLED BY A MICROPROCESSOR CONTROLLED STEP MOTOR AN ALLIMINUM CONDENSING UNIT PROPELLER FAN SHALL BE DIRECT-DRIVEN WITH PERMANENTLY

LUBRICATED OR BALL BEARING FAN MOTOR HAVING THERMAL OVERLOAD PROTECTION. FURNISH UNIT WITH WIND BAFFLE ACCESSORY FOR LOW AMBIENT COOLING DOWN TO 0°F OUTDOOR AIR TEMPERATURE. REFRIGERANT CHARGE: R-410A. M. THE OUTDOOR UNIT SHALL BE COMPATIBLE WITH THE INDOOR UNIT AND SHALL BE OF THE SAME CAPACITY AND SAME MANUFACTURER AS THE INDOOR UNIT. THE OUTDOOR UNIT SHALL BE EQUIPPED

WITH A CONTROL BOARD THAT INTERFACES WITH THE INDOOR UNIT TO PERFORM ALL NECESSARY N. THE CONTROL SYSTEM SHALL CONSIST OF TWO MICROPROCESSORS, ONE ON EACH INDOOR AND OUTDOOR UNIT, INTERCONNECTED BY A SINGLE, NON-POLAR TWO-CABLE. THE SYSTEM SHALL HAVE SELE-DIAGNOSTICS ABILITY AND SHALL BE CAPABLE OF AUTOMATIC RESTART WHEN POWER IS RESTORED. AFTER POWER INTERRUPTION. THE INDOOR UNIT SHALL BE CONNECTED TO A WALL-MOUNTED WIRED. CONTROLLER VIA 12VDC MONITORING SET TEMPERATURE, ROOM TEMPERATURE, AND COMPRESSOR OPERATION CONDITIONS. THE CONTROL SIGNAL BETWEEN THE INDOOR AND OUTDOOR UNITS SHALL BE

O. ACCEPTABLE MANUFACTURERS: ENVIROMASTER INTL. (EMI), FRIEDRICH, MITSUBISHI, SANYO, CARRIER. 23 93 30 CONTROL DAMPERS

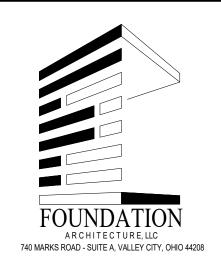
A. CONTROL DAMPERS SHALL BE LOW LEAKAGE PARALLEL BLADE TYPE. CONSTRUCT BLADES OF 16 GAUGE GALVANIZED STEEL OR AIR-FOIL SHAPED EXTRUDED 12-GAUGE (0.0181") ALUMINUM. PROVIDE HEAVY-DUTY MOLDED SELF-LUBRICATING OILITE OR SYNTHETIC BEARINGS WITH 1/2" DIAMETER STEEL AXLES SPACED ON MAXIMUM 6" CENTERS. CONSTRUCT FRAME OF MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL OR 0.125" THICK 6063-T5 EXTRUDED ALUMINUM HAT-SHAPED FRAME WITH STAINLESS STEEL FASTENERS. DAMPERS SHALL HAVE LEAKAGE OF LESS THAN 1/2% OR 20 SCFM/SO. FT. WHEN CLOSING AGAINST 4" WATER COLUMN STATIC PRESSURE AND WHEN SIZED FOR 2000 FPM VELOCITY CONTROL DAMPERS SHALL HAVE PLASTIC EDGE SEALS WITH A TEMPERATURE RANGE TO 150 °F AND

STAINLESS STEEL COMPRESSION TYPE JAMB SEALS. B. ACCEPTABLE MANUFACTURERS: AIR BALANCE, AMERICAN WARMING & VENTILATING, ARROW, GREENHECK,

Lee's Summit, Missouri PATRICK W. KLANAC NUMBER 29264 8-15-2025

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Akron, Ohio 44333

Phone: 330-666-3702

ptaengineering.com

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PROJECT#: 016-0402

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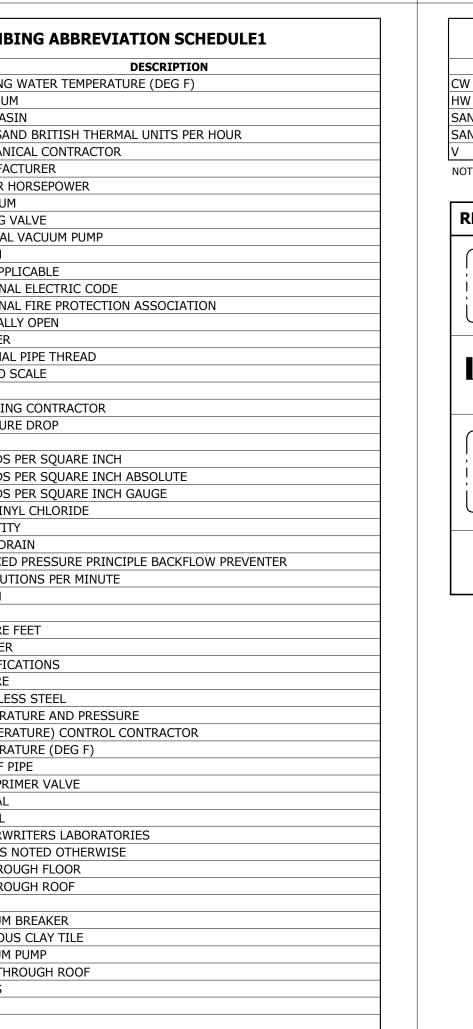
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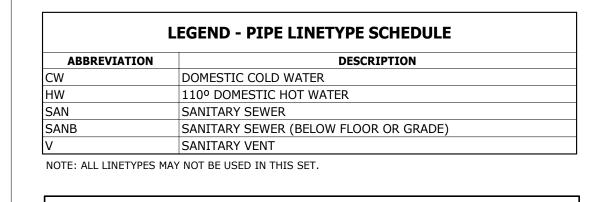
MECHANICAL SPECIFICATIONS

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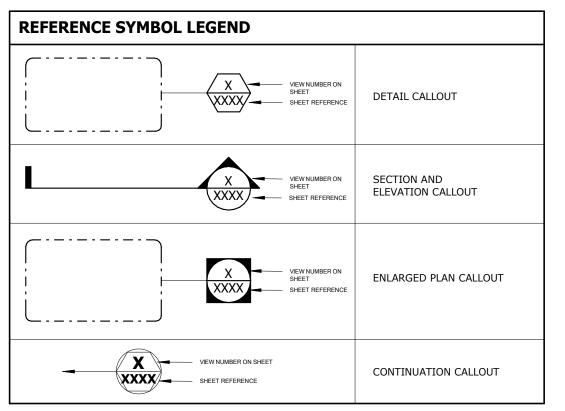
	PLUMBING ABBREVIATION SCHEDULE1		PLUMBING ABBREVIATION SCHEDUL
ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AD	AREA DRAIN	LWT	LEAVING WATER TEMPERATURE (DEG F)
AFF	ABOVE FINISHED FLOOR	MAX	MAXIMUM
AFG	ABOVE FINISHED GRADE	MB	MOP BASIN
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
AP	ACCESS PANEL	MC	MECHANICAL CONTRACTOR
APPROX	APPROXIMATELY	MFR	MANUFACTURER
ARCH	ARCHITECT, ARCHITECTURAL	MHP	MOTOR HORSEPOWER
BFG	BELOW FINISHED GRADE	MIN	MINIMUM
BHP	BRAKE HORSEPOWER	MV	MIXING VALVE
ВОР	BOTTOM OF PIPE	MVP	MEDICAL VACUUM PUMP
BT	BATHTUB	N	NORTH
BTUH	BRITISH THERMAL UNIT PER HOUR	NA, N/A	NOT APPLICABLE
CFH	CUBIC FEET PER HOUR	NEC NEC	NATIONAL ELECTRIC CODE
CI	CAST IRON	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
CS	CLINIC SINK	NO	NORMALLY OPEN
D	DEEP	NO	NUMBER
DCDA	DOUBLE CHECK DETECTOR ASSEMBLY	NPT	NOMINAL PIPE THREAD
DCVA	DOUBLE CHECK VALVE ASSEMBLY	NTS	NOT TO SCALE
DEG F	DEGREES FARENHEIT	P	PUMP
DEMO	DEMOLITION	PC	PLUMBING CONTRACTOR
DF	DRINKING FOUNTAIN	PD	PRESSURE DROP
DIA	DIAMETER	PH	PHASE
DN	DOWN	PSI	POUNDS PER SQUARE INCH
DS	DOWNSPOUT	PSIA	POUNDS PER SQUARE INCH ABSOLUTE
DTF	DOWN THROUGH FLOOR	PSIG	POUNDS PER SQUARE INCH GAUGE
DTR	DOWN THROUGH ROOF	PVC	POLYVINYL CHLORIDE
DWG	DRAWING	QTY	QUANTITY
DWH	DOMESTIC WATER HEATER	RD RD	ROOF DRAIN
DWS	DOMESTIC WATER SOFTENER	RPBP	REDUCED PRESSURE PRINCIPLE BACKFLOW PREV
E	EAST	RPM	REVOLUTIONS PER MINUTE
EA	EACH	S	SOUTH
EC	ELECTRICAL CONTRACTOR	S	SINK
ET	EXPANSION TANK	SF	SQUARE FEET
ETR	EXISTING TO REMAIN	SH	SHOWER
EWC	ELECTRIC WATER COOLER	SPECS	SPECIFICATIONS
EWT	ENTERING WATER TEMPERATURE (DEG F)	SQ	SQUARE
FD	FLOOR DRAIN	SS	STAINLESS STEEL
FFE	FINISHED FLOOR ELEVATION	T&P	TEMPERATURE AND PRESSURE
FP	FIRE PROTECTION	TCC	(TEMPERATURE) CONTROL CONTRACTOR
FPC	FIRE PROTECTION CONTRACTOR	TEMP	TEMPERATURE (DEG F)
FT	FEET	ТОР	TOP OF PIPE
GAL	GALLON	TP	TRAP PRIMER VALVE
GC	GENERAL CONTRACTOR	TYP	TYPICAL
GPD	GALLONS PER DAY	U	URINAL
GPH	GALLONS PER HOUR	UL	UNDERWRITERS LABORATORIES
GPM	GALLONS PER MINUTE	UNO	UNLESS NOTED OTHERWISE
GPR	GAS PRESSURE REGULATOR	UTF	UP THROUGH FLOOR
GV	GAS VENT	UTR	UP THROUGH ROOF
Н	HIGH	V	VOLTS
НВ	HOSE BIBB	VB	VACUUM BREAKER
HEAD	FEET OF WATER COLUMN PRESSURE	VCT	VITREOUS CLAY TILE
HOA	HAND-OFF-AUTOMATIC	VP	VACUUM PUMP
HP	HORSEPOWER	VTR	VENT THROUGH ROOF
HZ	HERTZ (CYCLES PER SECOND)	W	WATTS
IN	INCH	W	WEST
INV	INVERT ELEVATION	W	WIDE
KW	KILOWATT	WB	WALL BOX
L	LENGTH	WC	WATER CLOSET
LAV	LAVATORY	WHA	WATER HAMMER ARRESTOR
LT	LAUNDRY TUB	ZV	ZONE VALVE BOX

ABBREVIATIONS

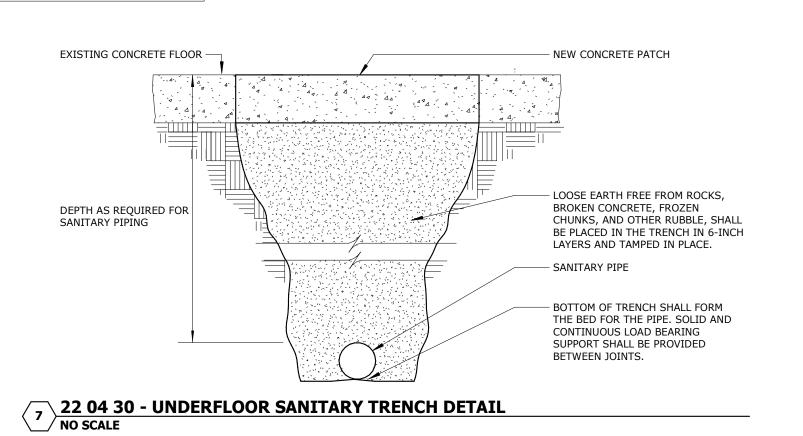




LINETYPES



CANTARY CEWER M	TAITMUM DIDE CLODEC
PIPE SIZE	SLOPE (PER FOOT)
2-1/2" OR LESS	1/4" (2%)
3" TO 6"	1/8" (1%)



DULE	
N	SHEET NUI
	P0.01
	P1.01
	P2.01
GRADE)	P3.01
	P4.01
	 P5.01

CE	ENLARGED PLAIN	CALLOUT	↑	PIPE UP THROUGH FLO
			Ŷ	EXISTING TO REMAIN I
	CONTINUATION C	CALLOUT	Ŷ	REMOVE PIPE UP THRO
ΡI	IPE SLOPES		NOTE: ALL SYMBOLS MAY NO	T BE USED IN THIS SET.
SI	LOPE R FOOT)		PIF	PE FITTINGS SY
	" (2%)		SYMBOL	
	" (1%)		П	САР
			2-100	CLEANOUT



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NUMBER
29264
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SYMBOL	DESCRIPTION	
Т	CAP	
<u></u>	CLEANOUT	
\bigcirc_{EWFCO}	CLEANOUT (FLUSH WITH FLOOR)	•
	EXPANSION JOINT	
	ORIFICE FLOW METER FITTING	
rg C	MANUAL AIR VENT	
-	MANUAL DRAIN VALVE WITH HOSE CONNECTION	
X	PIPE ANCHOR	
=	PIPE GUIDE	
D	REDUCER	
	TIE-IN POINT	
—c—	90° PIPE RISE OR DROP	
<u></u>	90° PIPE CONNECTION OUT OF BOTTTOM	
<u> </u>	90° PIPE CONNECTION OUT OF TOP	
ナー 土ー NITARY STANDARD	90° PIPE CONNECTION OUT OF SIDE	

DRAWING LIST

DRAWING LIST - PLUMBING

PIPING

PIPE DOWN THROUGH FLOOR/ROOF

PIPE UP THROUGH FLOOR/ROOF

REMOVE PIPE DOWN THROUGH FLOOR/ROOF

REMOVE PIPE UP THROUGH FLOOR/ROOF

PIPE FITTINGS SYMBOL LEGEND

DESCRIPTION

EXISTING TO REMAIN PIPE DOWN THROUGH FLOOR/ROOF

EXISTING TO REMAIN PIPE UP THROUGH FLOOR/ROOF

FIRST FLOOR PLUMBING DEMOLITION PLAN

FIRST FLOOR ENLARGED PLUMBING PLANS

PLUMBING SCHEDULES AND DETAILS

XX PIPE TYPE
XX PIPE SIZE - EQUIP. REF. PIPING SYMBOL LEGEND

SYMBOL

GENERAL INFORMATION

FIRST FLOOR PLUMBING PLAN

PLUMBING SPECIFICATIONS

0—	PIPING RISER UP
NOTE: ALL SYMBOLS MAY NO	T BE USED IN THIS SET.
PLUME	SING PIPE ACCESSORIES LEGEND
SYMBOL	DESCRIPTION
以	AUTO BALANCE VALVE
£	MANUAL BALANCE VALVE
₩.	BALL VALVE
	BUTTERFLY VALVE
4	CHECK VALVE
	FLEXIBLE CONNECTION - WOVEN METAL
\nearrow	GAS COCK
\bowtie	GATE VALVE
Ħ	STRAINER
□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	STRAINER WITH BLOWDOWN VALVE
ı₹ı	PLUG VALVE
Ď	PRESSURE REDUCING VALVE (PRV)

NOTE: ALL SYMBOLS MAY NOT BE USED IN THIS SET.

PIPING RISER DOWN

ENANT

NRK:	ISSUE:		DATE
	ISSUED		08/15/20

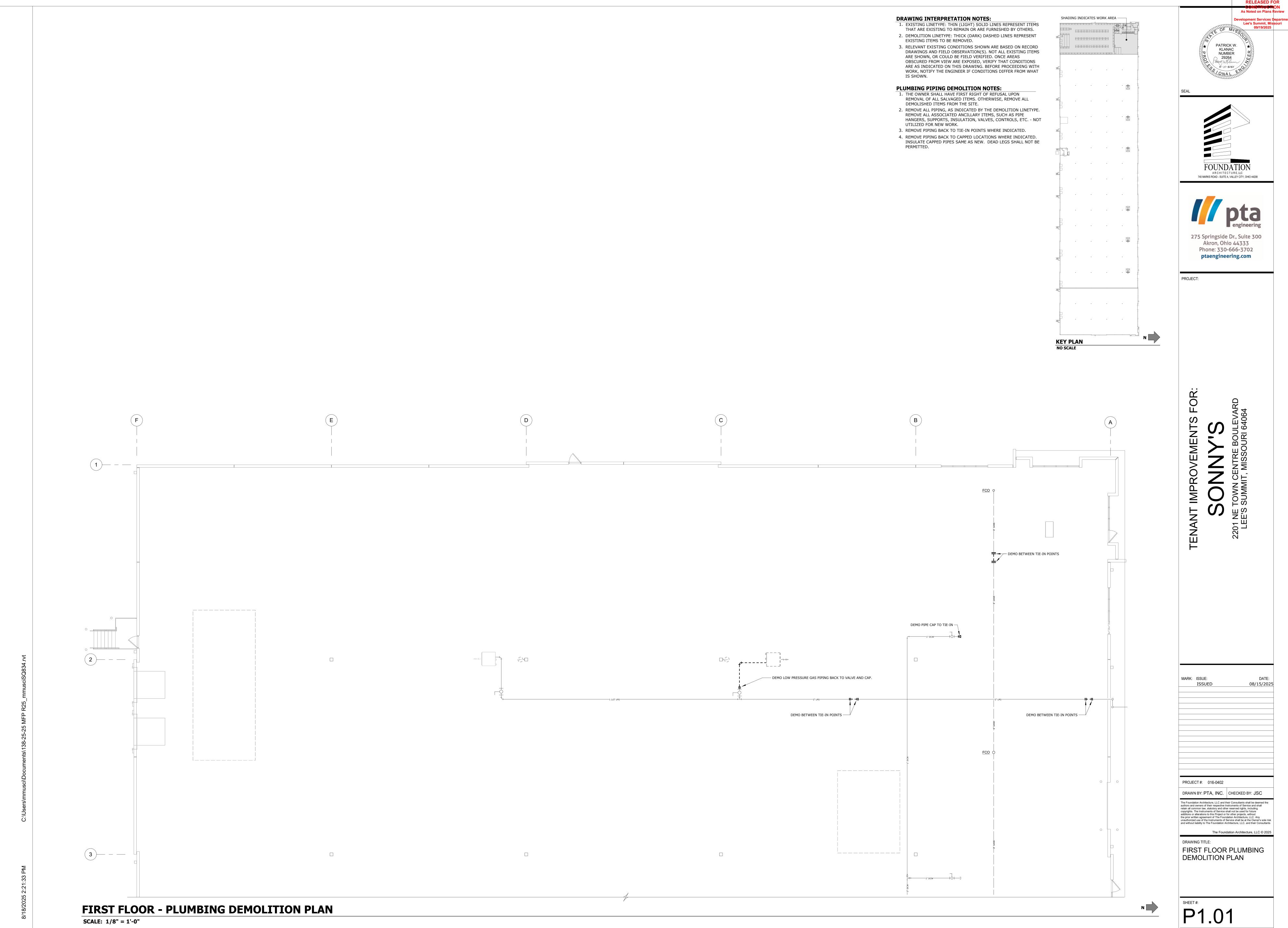
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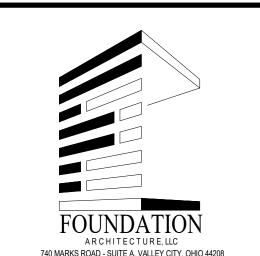
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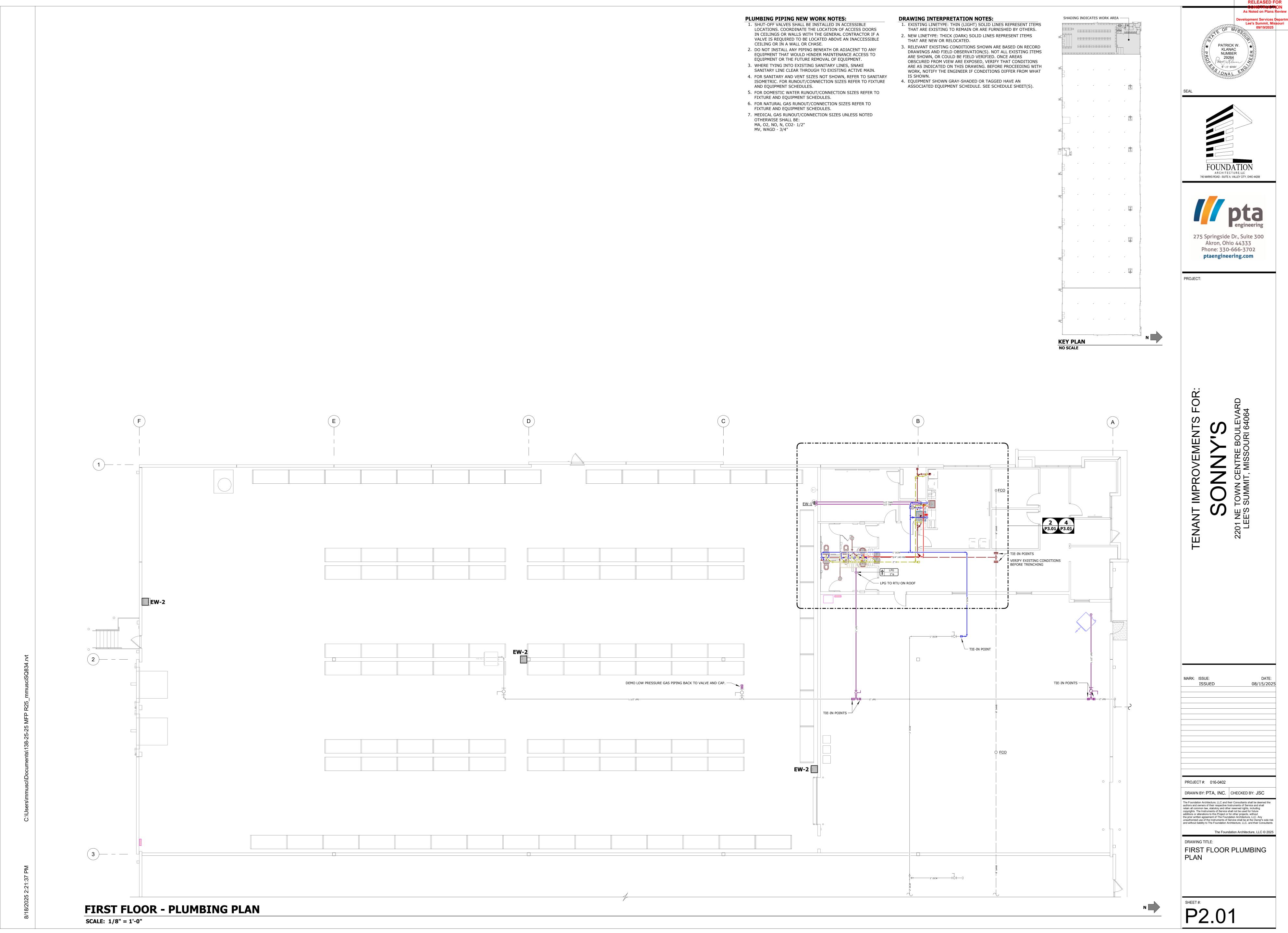
P0.01



Development Services Departm Lee's Summit, Missouri 09/19/2025







Lee's Summit, Missouri





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2 FIRST FLOOR - ENLARGED PLUMBING PLAN
P2.01 1/4" = 1'-0"

RELEVANT EXISTING CONDITIONS SHOWN ARE BASED ON RECORD DRAWINGS AND FIELD OBSERVATION(S). NOT ALL EXISTING ITEMS ARE SHOWN, OR COULD BE FIELD VERIFIED. ONCE AREAS OBSCURED FROM VIEW ARE EXPOSED, VERIFY THAT CONDITIONS ARE AS INDICATED ON THIS DRAWING. BEFORE PROCEEDING WITH WORK, NOTIFY THE ENGINEER IF CONDITIONS DIFFER FROM WHAT 4. EQUIPMENT SHOWN GRAY-SHADED OR TAGGED HAVE AN ASSOCIATED EQUIPMENT SCHEDULE. SEE SCHEDULE SHEET(S). 5. EQUIPMENT AND ITEMS TO BE RELOCATED ARE IDENTIFIED ON THE PLANS AND/OR EQUIPMENT SCHEDULE(S). FCO FCO

ENLARGED KEY PLAN

NO SCALE

SHADING INDICATES WORK AREA

DRAWING INTERPRETATION NOTES:

EXISTING ITEMS TO BE REMOVED.

IS SHOWN.

1. EXISTING LINETYPE: THIN (LIGHT) SOLID LINES REPRESENT ITEMS

THAT ARE EXISTING TO REMAIN OR ARE FURNISHED BY OTHERS. 2. DEMOLITION LINETYPE: THICK (DARK) DASHED LINES REPRESENT

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KLANAC NUMBER 29264

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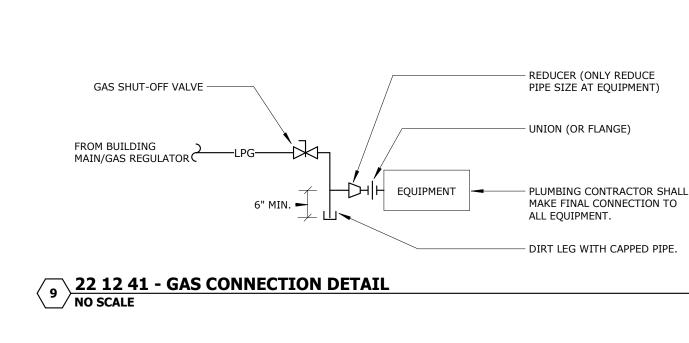
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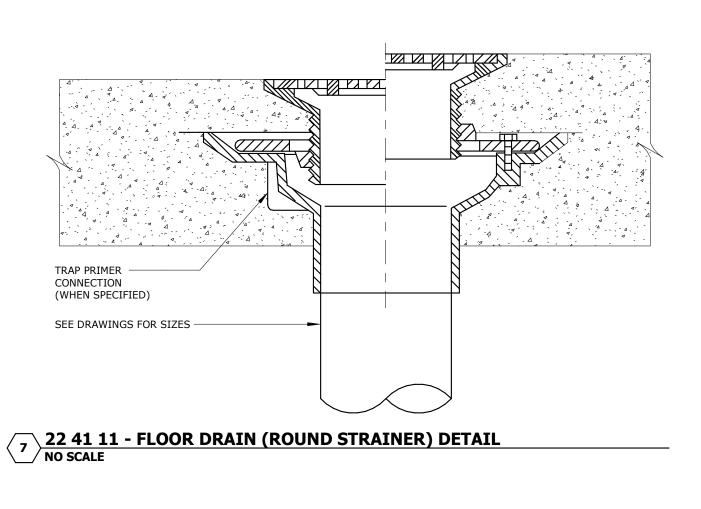
P3.01

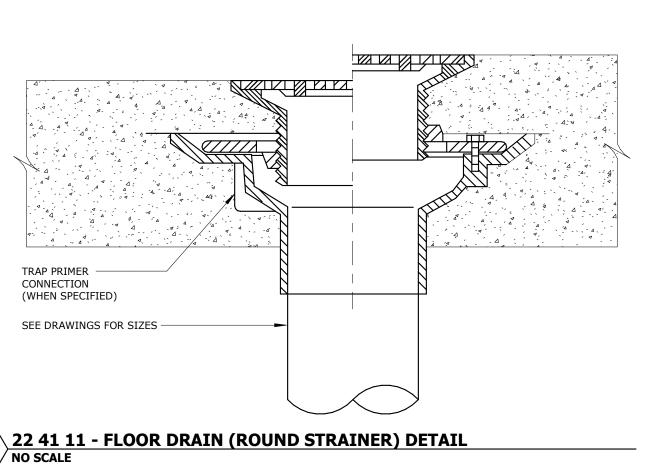
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ENLARGED PLUMBING

PLANS







WATTS MODEL N36

BALL VALVE (TYPICAL) —

THERMOMETER (TYP.) —

STAINLESS STEEL UNION, NIPPLE,

TEMPERATURE/PRESSURE RELIEF -VALVE, ROUTE DISCHARGE PIPE

(SAME SIZE AS VALVE OUTLET) TO

AND COUPLING (TYPICAL).

MOP BASIN WITH AIR GAP.

DRAIN VALVE WITH HOSE

22 21 20 - ELECTRIC DOMESTIC WATER HEATER PIPING DETAIL
NO SCALE

80 TW TO BUILDING

140 HW FROM WATER HEATER 2 140 HW

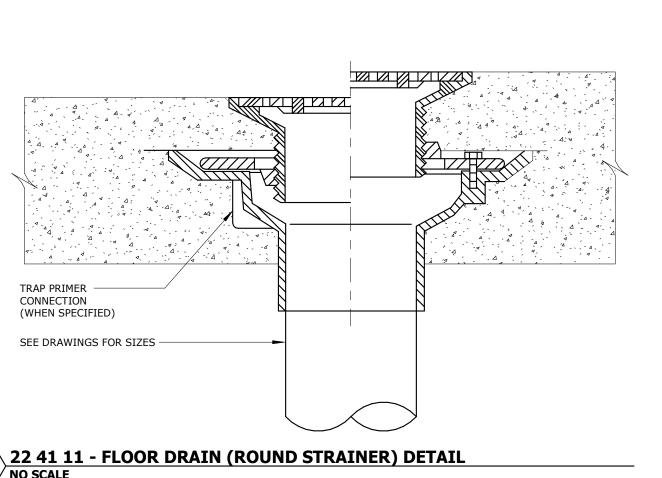
22 13 11 - MASTER MIXING VALVE DETAIL
NO SCALE

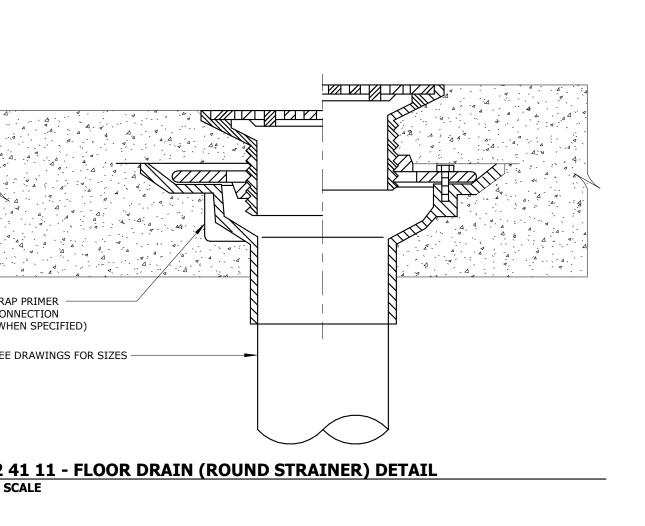
INSTALLATION IN CAST IRON PIPE DEPICTED. INSTALLATION IN PVC PIPE, WHEN PERMITTED, SHALL BE SIMILAR. SEE SPECIFICATION FOR

22 12 60 - FLUSH WITH WALL CLEANOUT NO SCALE

ALLOWABLE PIPING MATERIALS.

CONNECTION





RTW FROM BUILDING

MANUAL BALANCE VALVE: 0.3 GPM

MANUAL BALANCE VALVE: 0.3 GPM

_-----

RTW TO CW INLET OF MIXING VALVE

<u>_._._.</u>

SWING CHECK VALVE

PROVIDE SUPPORT FROM STRUCTURE ABOVE OR FROM

(INDEPENDENT FROM PIPING).

WELDED STEEL STAND AS REQUIRED IN ORDER TO

PAINT FRAME AFTER

DRIP PAN TO BE PIPED TO MOP BASIN WITH AIR GAP.

ASSEMBLY.

MIXING VALVE

CHECK VALVE (INSTALLED IN PIPING,

INTEGRAL CHECKS ALONE

NOT ACCEPTABLE)

CW FROM BUILDING

— RISER PIPE

- CHASE WALL

 FULL CALIBRE FERRULE TAPER THREAD PLUG (4" DIA. MIN)

— 6" DIA. STAINLESS STEEL

SHALLOW WALL COVER

ALLOW FOR GRAVITY DRAIN

INTO MOP BASIN, PRIME AND

TWR FROM RECIRC PUMP P4.01

ELECTRIC OUTLET LOCATION. -

PRESSURE GAUGE COMMON TO ———

PUMP WITH 3/8" BALL SHUTOFF VALVES

SUCTION AND DISCHARGE SIDES OF

CHECK VALVE -

FLEXIBLE

(TYPICAL).

EXTEND HW TO

SHUT-OFF VALVE AND CHECK VALVE. -

DRAIN INTO -

VENT STACK —

FLASHING —

ROOF MEMBRANE —

ROOF DECK —

SECURE SLEEVE -

TO ROOF DECK

ROOF INSULATION —

DISHWASHER WITH

6 22 40 20 - ANCILLARY EQUIPMENT PIPING DETAIL NO SCALE

ELECTRIC WATER COOLER INSTALLATION DETAIL

22 24 20 - RECIRCULATOR PUMP PIPING DETAIL (WITHOUT AQUASTAT)
NO SCALE

COUNTER TOP

CABINET BOTTOM

FLOOR

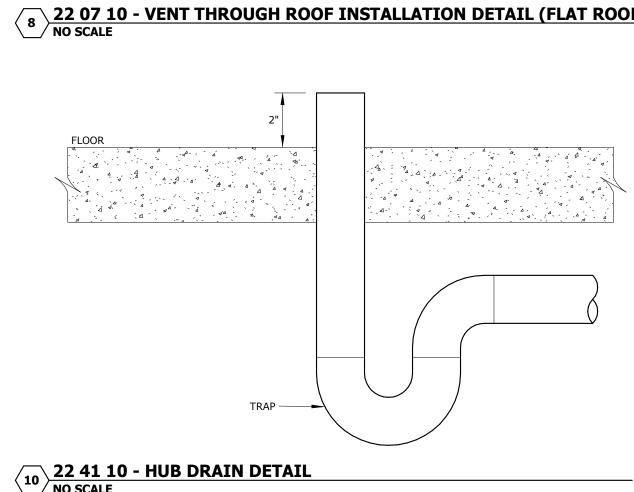
INTO VENT STACK

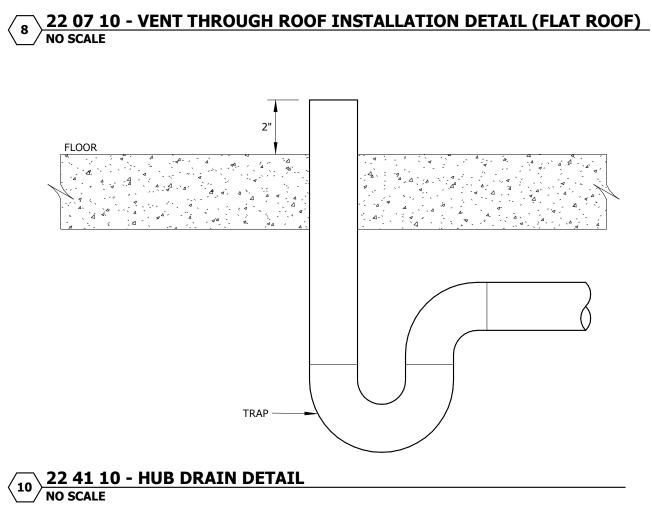
___ SLEEVE

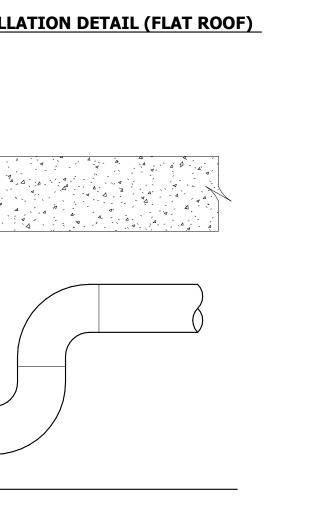
EXPANSION TANK; AMTROL, MODEL ST-5-C.

ADJACENT WALL

140 HW TO MIXING VALVE AND BUILDING







— BOTTLE FILLER.

WASTE LOCATION.

DOMESTIC COLD WATER

CONNECTION LOCATION.

- BALL VALVE (TYPICAL)

CONCENTRIC INCREASER/

REDUCER AS REQUIRED

(TYPICAL)

BALL VALVE (TYPICAL).

WATT MODEL SD-3 DUAL CHECK VALVE;

- WATTS MODEL F7 DUAL CHECK VALVE

(TYPICAL); EXTEND 1/2" CW TO ICE MAKER.

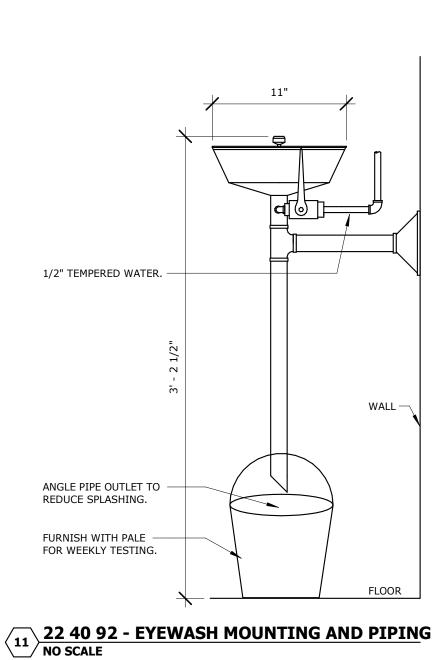
- INLINE WATER FILTER: AQUA-PURE MODEL AP717 OR APPROVED EQUAL (TYPICAL).

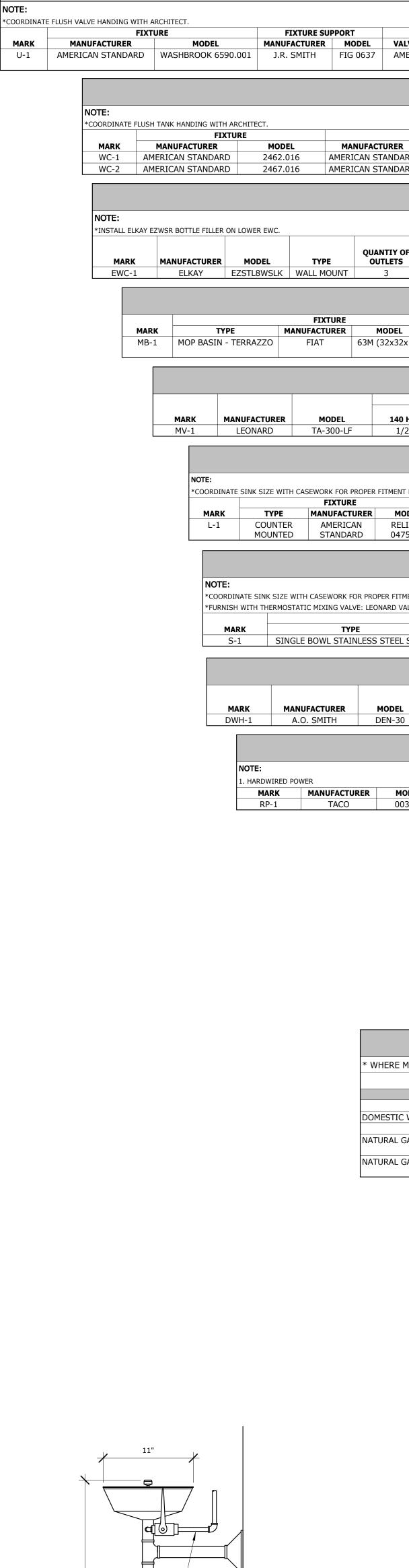
— CW TAP TO WATER HEATER (NOT SHOWN).

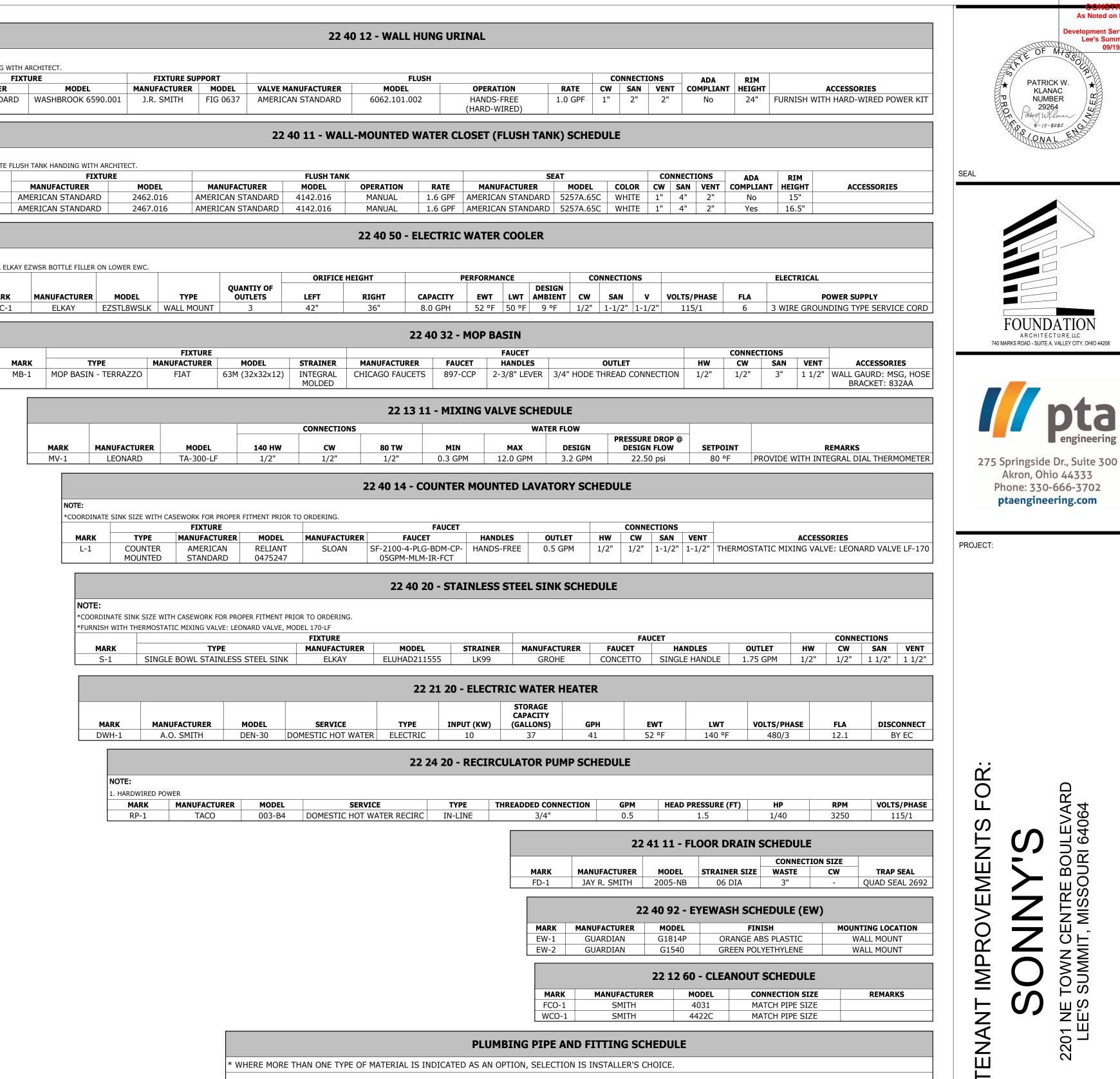
- ANGLE STOP VALVE (TYPICAL).

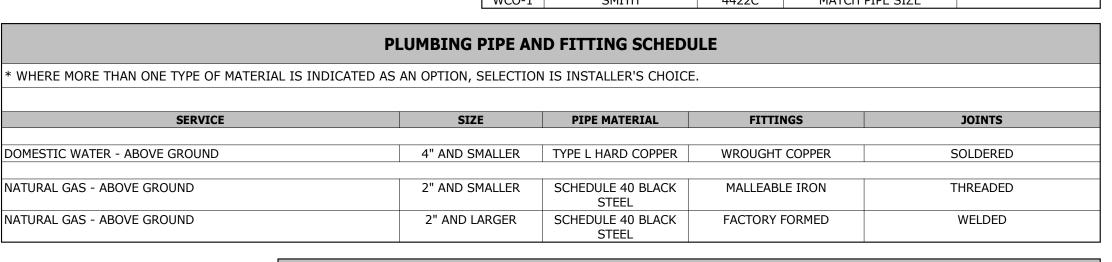
EXTEND 1/2" CW TO COFFEE MAKER.

- INLINE PUMP



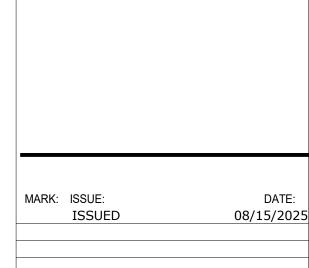






FP	PREFORMED ONE-PIECE FIBERGLASS PIPE INSULATION WITH ALL-SERVICE JACKET; MAXIMUM THERMAL CONDUCTIVITY K=0.23 AT 75 DEG. F MEAN TEMPERATURE.									
ER	FLEXIBLE, CLOSED-CELL, ELASTOMERIC ROLL INSULATION; MAXIMUM THERMAL CONDUCTIVITY K = 0.28 AT 70 DEG. MEAN TEMPERATURE.									
EP	FLEXIBLE LINICELLULAD DREEORMED ELASTOMEDIC DIDE INSULATION: MAXIMUM THERMAL CONDUCTIVITY K = 0.28									
INSULATION	FINISH DESCRIPTIONS									
AJ	0.016" THICK SHEET ALUMINUM JACKET WITH MOLDED UV RESISTANT PVC FITTING COVERS									
ASJ	ALL SERVICE JACKET WITH SELF-SEAL LAP									
	SERVICE	ТҮРЕ	THICKNESS	FINISH						
	HOT, RECIRCULATING HOT, AND COLD WATER PIPING	FP	1"	ASJ						
DOMESTIC H										

PLUMBING INSULATION SCHEDULE



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ARCHITECTURE, LLC

PROJECT#: 016-0402

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P4.01

PART 2 - 22 00 10 DOCUMENT INTERPRETATION AND GENERAL REQUIREMENTS

PART 1 - PLUMBING

B. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION WORK SHOWN ON THE DRAWINGS. DEMOLITION WORK SHALL INCLUDE REMOVAL, CUTTING AND PATCHING, SALVAGE, AND LEGAL DISPOSAL AS APPLICABLE TO THE PROJECT.

- C. ALL WORK DETAILS NOT COVERED IN THESE SPECIFICATIONS SHALL BE GOVERNED BY THE REQUIREMENTS OF THE LATEST EDITION OF THE MISSOURI PLUMBING CODE.
- D. WORK INCLUDED UNDER THIS DIVISION SHALL CONSIST OF FURNISHING ALL MATERIALS, SUPPLIES. EQUIPMENT, TOOLS, TRANSPORTATION, FACILITIES AND PERFORMING ALL LABOR AND SERVICES NECESSARY FOR THE COMPLETE INSTALLATION OF THE PLUMBING SYSTEMS SHOWN.
- E. THIS CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE WORK TO BE DONE UNDER OTHER DIVISIONS OF THIS SPECIFICATION AND THEIR RELATED DRAWINGS AND SHALL SO COORDINATE AND SCHEDULE HIS WORK AS NOT TO CAUSE DELAYS OR INTERFERENCE WITH THE WORK OF OTHERS. SUCH COORDINATION AND SCHEDULING SHALL ACCOMPLISH THE INSTALLATION PLUMBING SYSTEMS AND PIPING WITH A MINIMUM OF CUTTING THROUGH MASONRY AND OTHER ADJUSTMENTS.
- F. ALL ITEMS OF LABOR, MATERIAL AND EQUIPMENT NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON PLANS, BUT INCIDENTAL TO, OR REQUIRED FOR THE COMPLETE INSTALLATION AND PROPER OPERATION OF THE WORK, SHALL BE FURNISHED AS IF CALLED FOR IN DETAIL BY THE SPECIFICATIONS OR
- G. THE DESIGN DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT, AND LOCATIONS OF EQUIPMENT AND PIPING. VERIFY DIMENSIONS IN THE FIELD: ADJUST TO MANUFACTURER'S SHOP DRAWINGS. DO NOT SCALE DRAWINGS. PIPING, AND EOUIPMENT ARE TO BE INSTALLED ALONG THE GENERAL PLANS SHOWN ON THE DRAWINGS, BUT KEEPING IN MIND ACTUAL BUILDING CONDITIONS WHICH MUST BE CONFORMED WITHIN THE ACTUAL WORK.
- H. DETERMINE SIZES AND LOCATIONS FOR CHASES AND OPENINGS NECESSARY FOR INSTALLATION OF THE WORK. COOPERATE WITH OTHER TRADES IN SETTING SLEEVES, INSERTS AND HANGERS. I. ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND SHALL CONFORM TO UNDERWRITERS' LABORATORIES STANDARDS, WHERE APPLICABLE. WHERE SPECIFICATIONS DESCRIBE, OR PLANS SHOW, MATERIALS OR

EOUIPMENT OF HIGHER OUALITY THAN REOUIRED BY CODE AND LOCAL RULING, THE DRAWINGS AND

- SPECIFICATIONS SHALL GOVERN THE QUALITY OF THE MATERIAL OR EQUIPMENT. . COOPERATE WITH ALL TRADES IN PREPARING INTERFERENCE DRAWINGS FOR LOCATIONS WHERE THERE IS POSSIBLE CONFLICT BETWEEN TRADES. EXACT LOCATION OF PIPES, DUCTS, AND CONDUIT BASED ON FIELD MEASUREMENTS WITH FINAL ARRANGEMENT DETERMINED BY INTRA-TRADE AGREEMENTS SUBJECT ΓΟ ARCHITECT/ENGINEER'S APPROVAL.
- K. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER BY FIRST-CLASS MECHANICS. THE CONTRACTOR SHALL PROVIDE ADEQUATE AND COMPETENT SUPERVISION OF THE JOB AS REQUIRED.
- PIPING, AND FOUIPMENT SHALL BE ARRANGED SUBSTANTIALLY AS INDICATED. ANY CHANGES RESULTING IN A SAVINGS IN LABOR OR MATERIAL SHALL BE MADE ONLY IN ACCORDANCE WITH A CONTRACT CHANGE ORDER. DEVIATIONS SHALL BE MADE ONLY WHERE NECESSARY TO AVOID INTERFERENCES AND ONLY AFTER DRAWINGS SHOWING THE PROPOSED DEVIATIONS HAVE BEEN SUBMITTED TO AND APPROVED BY THE ARCHITECT/ENGINEER.
- M. THE ARCHITECT AND ENGINEER RESERVE THE RIGHT TO MAKE REASONABLE CHANGES WITHOUT EXTRA COST TO THE OWNER.
- N. COORDINATE ALL SYSTEM SHUT-DOWNS WITH THE OWNER.
- (1) THIS CONTRACTOR SHALL GUARANTEE FOR A PERIOD OF ONE YEAR THAT ALL WORK AND EQUIPMENT WILL REMAIN FREE FROM ALL DEFECTS IN WORKMANSHIP AND MATERIALS, AND THAT IT WILL COMPLY WITH ALL THE SPECIFIC REQUIREMENTS OF THE SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS GOVERNING THE WORK.
- (2) ALL WORK FOUND BY THE ARCHITECT/ENGINEER TO BE DEFECTIVE WILL BE REPLACED WITH NEW WORK MEETING ALL THE REOUIREMENTS OF THE CONTRACT. THIS CONTRACTOR WILL BEAR ALL COSTS OF SUPPLYING SUCH NEW WORK, AND INSTALLING AND FINISHING SAME, AND WILL ASSUME ALL COSTS FOR REPLACING OTHER WORK DAMAGED BY THE REMOVAL AND REPLACEMENT OF ANY OF THE WORK. THIS CONTRACTOR WILL BEAR ALL COSTS FOR FREIGHT, DRAYAGE AND DEMURRAGE, AND ALL LABOR IN CONNECTION THEREWITH.
- BIDDERS DESIRING TO MAKE A SUBSTITUTION FOR AN ALTERNATIVE EQUIPMENT MANUFACTURER MATERIAL OR INSTALLATION METHOD NOT LISTED IN THE SPECIFICATIONS SHALL SUBMIT A WRITTEN REQUEST FOR A SUBSTITUTION TO THE ARCHITECT A MINIMUM OF FIVE WORKING DAYS PRIOR TO THE BID DUE DATE. THE SUBSTITUTION PROPOSAL SHALL INCLUDE THE FOLLOWING: (2) PROPOSED SUBSTITUTION STATEMENT NAMING THE ALTERNATIVE MANUFACTURER, MATERIAL OR
- INSTALLATION METHOD. (3) ALONG WITH EACH PROPOSAL, EACH EQUIPMENT SUPPLIER SHALL SUBMIT AN EQUIPMENT OR MATERIALS INFORMATION BINDER FOR REVIEW. FACH BINDER SHALL CONTAIN DETAILED FOLIPMENT
- INFORMATION, MATERIALS AND SPECIFICATIONS FOR EACH PIECE OF EQUIPMENT OR MATERIALS PROPOSED TO BE FURNISHED (4) ALONG WITH EACH PROPOSAL, THE CONTRACTOR SHALL PROVIDE MODIFIED DRAWINGS SHOWING
- THE INSTALLATION OF THE PROPOSED EQUIPMENT (5) ALONG WITH EACH PROPOSAL, EACH EQUIPMENT SUPPLIER SHALL SUBMIT A COMPLIANCE REVIEW RESPONSE TO THE AFFECTED CONTRACT DOCUMENT SPECIFICATIONS. THE REVIEW SHALL BE PARAGRAPH BY PARAGRAPH DESIGNATING IN THE FRONT OF EACH PARAGRAPH-SPECIFICATION COMPLIANCE WITH A "C", DEVIATION WITH A "D", OR EXCEPTION WITH AN "E". THE REASON FOR EACH PROPOSED DEVIATION AND EXCEPTION SHALL BE GIVEN ALONG WITH SUFFICIENT DETAIL TO

CLEARLY EXPLAIN/SHOW ALL DEVIATIONS AND EXCEPTIONS. KEY DEVIATION OR EXCEPTION

- (A) THE EFFECT ON PERFORMANCE OVER THE ENTIRE RANGE OF EQUIPMENT OR SYSTEM OPERATION, INCLUDING THE EFFECT ON SYSTEM EFFICIENCIES. (B) THE EFFECT ON THE WORK OF OTHER TRADES CAUSED BY THE PROPOSED SUBSTITUTION.
- (6) ACCEPTANCE OR REJECTION OF THE PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO APPROVAL BY THE ARCHITECT, ENGINEER OR OWNER. PART 3 - 22 00 20 CODES AND STANDARDS
- A. ALL PLUMBING SYSTEMS SHALL COMPLY WITH THE MISSOURI PLUMBING CODE AND ALL REQUIREMENTS OF THE LOCAL AUTHORITIES HAVING JURISDICTION.
- B. PLUMBING SYSTEMS SHALL COMPLY WITH ASPE, ASSE AND AWWA REQUIREMENTS C ALL GAS PIPING DOMESTIC WATER PIPING STORM AND SANITARY SEWERS SHALL BE INSTALLED INSPECTED, AND TESTED AS REQUIRED BY THE LOCAL PLUMBING CODE AND THE LOCAL AUTHORITY
- HAVING JURISDICTION AND THE LOCAL UTILITY. PERFORM ALL TESTS BEFORE PIPING IS CONCEALED OR D. INSTALL WORK IN FULL ACCORDANCE WITH RULES AND REGULATIONS OF STATE, COUNTY AND CITY
- AUTHORITIES HAVING JURISDICTION OVER PREMISES. THIS SHALL INCLUDE SAFETY REQUIREMENTS OF E. REFERENCE TO THE CODES AND STANDARDS LISTED SHALL CONSTITUTE THE MINIMUM ACCEPTABLE
- REOUIREMENTS. NOTHING IN THE SPECIFICATIONS SHALL BE CONSTRUED TO PERMIT DEVIATION FROM THE REOUIREMENTS OF THE GOVERNING CODE. WHERE REOUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS EXCEED THOSE OF THE CODE LISTED, FOLLOW THE DRAWINGS AND SPECIFICATIONS. F. ALL WIRING SHALL BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE, APPLICABLE STATE CODE, APPLICABLE LOCAL (CITY) CODE, AND OSHA. IN CASES OF CONFLICT BETWEEN CODE AND SPECIFICATIONS, THE MORE RESTRICTIVE REQUIREMENTS SHALL GOVERN
- G. ALL EQUIPMENT, MATERIALS AND INSTALLATION METHODS SHALL COMPLY WITH THE FOLLOWING CODES,
- (1) BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL (BOCA)
- (2) CODES AND STANDARDS ASSOCIATION (CSA) (3) INTERNATIONAL BUILDING CODE (IBC)
- (4) INTERNATIONAL MECHANICAL CODE (IMC) (5) NATIONAL ELECTRIC CODE (NEC)
- (6) NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
- (7) NATIONAL PRESSURE VESSEL CODE (8) STANDARD BUILDING CODES (SBC)
- (9) STANDARD MECHANICAL CODES (SMC) (10)UNIFORM BUILDING CODES (UBC)
- (11)UNIFORM MECHANICAL CODES (UMC)
- H. ALL EQUIPMENT. MATERIALS AND, INSTALLATION METHODS SHALL COMPLY WITH THE FOLLOWING
- (1) AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) (2) AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
- (3) AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)
- (4) AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE) (5) AMERICAN WATER WORKS ASSOCIATION (AWWA)
- (6) AMERICAN WELDING SOCIETY (AWS)
- (7) BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL (BOCA)
- (8) CAST IRON SOIL PIPE INSTITUTE (CISPI)
- (9) CODES AND STANDARDS ASSOCIATION (CSA)
- (10)FLUID SEALING ASSOCIATION (FSA) (11)INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)
- (12)NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)
- (13)NATIONAL PRESSURE VESSEL CODE (14)NATIONAL SANITATION FOUNDATION (NSF)
- (15)NATIONAL SCIENCE FOUNDATION (NSF)
- (16)PLASTIC PIPE INSTITUTE (PPI)

PART 4 - 22 00 40 PLUMBING DEMOLITION AND SALVAGE

- (17)SHEETMETAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC. (SMACNA) (18)UNDERWRITER'S LABORATORIES OF CANADA (ULC) (19)UNDERWRITER'S LABORATORIES, INC. (UL)
- . EACH CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR THE INSTALLATION OF THE WORK SHOWN. ALL PERMITS AND CERTIFICATES OF INSPECTION AND APPROVAL SIGNED BY THE CONTROLLING BUILDING DEPARTMENT OR AUTHORITY HAVING JURISDICTION SHALL BECOME PROPERTY OF THE OWNER. DELIVER ALL CERTIFICATES TO THE OWNER IN DUPLICATE. J. ALL EQUIPMENT, MATERIALS AND INSTALLATION SHALL COMPLY WITH THE NATIONAL FIRE PROTECTION
- ASSOCIATION'S "NATIONAL FIRE CODES" AND "NATIONAL ELECTRICAL CODE". EQUIPMENT SHALL BEAR THE "UL" LABEL AS REQUIRED BY THESE CODES. K. FOLLOWING COMPLETION OF THE WORK:
- (2) DEMONSTRATE TO THE OWNER'S SATISFACTION THE PROPER OPERATION OF EACH OF THE SYSTEMS COMPRISING THIS CONTRACT BEFORE FINAL PAYMENT.

(1) FURNISH TO THE OWNER, DUPLICATE CERTIFICATES OF INSPECTION AND APPROVAL BY REGULATORY

- PING FOR LEAKS; REPAIR LEAKS IN COPPER TUBING BY SWEATING OUT JOINTS, THOROUGH CLEANING BOTH TUBE AND FITTING, AND RESOLDERING OR REBRAZING; CORRECT LEAKS IN SCREWED JOINTS BY REPLACING THREAD OR FITTING OR BOTH.
- (4) IMMEDIATELY CORRECT ANY WORK FOUND AT VARIANCE WITH THESE SPECIFICATIONS, THE NATIONAL, STATE, AND LOCAL CODES, AND REQUIREMENTS OF GOVERNING REGULATORY AGENCIES. COMPLETE ALL PUNCHLIST ITEMS OF THE ARCHITECT AND ENGINEER.
- A. DEMOLITION WORK SERVICES) <u>ACTIVE SERVICES</u>: WHEN ENCOUNTERED, SUPPORT ACTIVE PLUMBING SERVICES AS NECESSARY. IF ACTIVE SERVICES REQUIRE RELOCATION (OTHER THAN THOSE INDICATED ON THE DRAWINGS), OBTAIN WRITTEN INSTRUCTIONS BEFORE PROCEEDING. DO NOT DISTURB ACTIVE SERVICES
- 2) <u>INACTIVE OR ABANDONED SERVICES</u>: WHEN ENCOUNTERED, REMOVE INACTIVE AND ABANDONED PIPING FULL LENGTH,REMOVAL SHALL INCLUDE ALL HANGERS AND SUPPORTS,NOTIFY SERVICING UTILITY WHEN ENCOUNTERED OUTSIDE OF STRUCTURE. "DEAD LEGS" SHALL NOT BE LEFT IN ANY
- (3) <u>INTERRUPTION OF SERVICE</u>: SEE "PLUMBING SYSTEMS SHUT-DOWNS" SECTION IN THESE SPECIFICATIONS FOR PROCEDURES AND REQUIREMENTS. B. DEMOLITION WORK - GENERAL

TO MAINTAIN SERVICE TO EQUIPMENT AND FIXTURES THAT ARE TO REMAIN.

1) REMOVE ALL EXISTING FIXTURES, PIPING, CONTROLS, WIRING AND FOUIPMENT AS INDICATED ON THE DRAWINGS OR THOSE THAT ARE NOT NECESSARY TO MAINTAIN SERVICE TO EQUIPMENT AND

(2) RELOCATE OR EXTEND AS REQUIRED, PIPING THAT INTERFERES WITH DEMOLITION AND IS ESSENTIAL

- (3) REMOVE OR RELOCATE ALL EQUIPMENT AND FIXTURES SPECIFICALLY INDICATED ON THE DRAWINGS AND AS REQUIRED TO COMPLETE DEMOLITION WORK
- (4) IN THOSE CASES WHERE EQUIPMENT AND FIXTURES ARE REMOVED, THE ASSOCIATED PIPING THAT WILL NO LONGER BE ACTIVE SHALL BE REMOVED. ALL PIPING TO BE REMOVED SHALL BE REMOVED FULL LENGTH BACK TO THE SOURCE OR AN ACTIVE LINE OR PORTION OF THE SYSTEM.
- (5) ALL HOLES OR DAMAGE CAUSED BY THE REMOVAL OF EXISTING EQUIPMENT, FIXTURES, AND PIPING SHALL BE PROPERLY PATCHED. HOLES SHALL BE NEATLY PATCHED WITH SUITABLE MATERIALS TO MATCH EXISTING SURFACES.
- (6) PIPING THAT IS INDICATED TO BE REMOVED AND PENETRATES THE GROUND FLOOR SLAB SHALL BE REMOVED TO WITHIN SIX (6) INCHES OF THE TOP OF FLOOR SLAB, AND CAPPED. (7) PIPING THAT IS INDICATED TO BE REMOVED AND PENETRATES THE BASEMENT EXTERIOR WALL AND CONTINUES OUTSIDE THE BUILDING BELOW GRADE SHALL BE CUT WITHIN SIX (6) INCHES OF THE

INSIDE SURFACE OF THE EXTERIOR WALL AND CAPPED.

C. SAFE DISPOSAL OF HAZARDOUS MATERIALS

- (1) CONTRACTOR SHALL SAFELY DISPOSE OF ALL HAZARDOUS MATERIALS ENCOUNTERED IN FULL COMPLIANCE WITH ALL FEDERAL AND STATE EPA REGULATIONS.
- (2) CONTRACTOR SHALL IDENTIFY INSTALLED FACILITIES REQUIRING REMOVAL OR MODIFICATION THAT ARE SUSPECTED TO CONTAIN ASBESTOS INSULATION. IF SUSPICIOUS INSULATION IS ENCOUNTERED THE CONTRACTOR WILL CEASE DEMOLITION OR MODIFICATIONS AND SHALL NOTIFY THE OWNER. (3) THE CONTRACTOR SHALL NOT BE RESPONSIBLE FOR REMOVAL OF ASBESTOS INSULATION.
- (4) THE CONTRACTOR SHALL WORK WITH THE OWNER'S ASBESTOS REMOVAL AND ABATEMENT CONTRACTOR TO PRIORITIZE ABATEMENT WORK AND DEVELOP A SCHEDULE FOR REMOVAL OF HAZARDOUS MATERIALS SO AS NOT TO AFFECT THE MECHANICAL CONTRACTUAL TIMEFRAME.
- (1) PLUMBING FIXTURES, EQUIPMENT, PIPING AND DEVICES THAT ARE TO BE REMOVED SHALL BE OFFERED TO THE OWNER FOR SALVAGE. FIXTURES, EQUIPMENT, PIPING AND DEVICES SELECTED SHALL BE STORED ON THE SITE AT AREAS DESIGNATED BY THE OWNER.
- (2) ALL ITEMS NOT SELECTED FOR SALVAGE BY THE OWNER SHALL BECOME THE PROPERTY OF THE PLUMBING CONTRACTOR AND SHALL BE REMOVED FROM THE SITE BY THE PLUMBING CONTRACTOR. PART 5 - 22 00 50 PLUMBING SYSTEM SHUTDOWNS
- (1) THE CONTRACTOR SHALL WORK WITH THE OWNER TO SCHEDULE AND PLAN REQUIRED SYSTEM SHUTDOWNS. THE CONTRACTOR SHALL IDENTIFY ALL NECESSARY SHUTDOWNS AND SHALL IDENTIFY THE APPROXIMATE DATE(S) SHUTDOWNS WILL BE REQUIRED AT THE OUTSET OF THE PROJECT.
- OWNER, EVEN IF THEY ARE REQUIRED TO BE PERFORMED ON WEEKENDS OR AFTER NORMAL BUSINESS (3) THE CONTRACTOR SHALL WORK WITH THE OWNER'S PERSONNEL TO IDENTIFY ISOLATION VALVES IN THE EXISTING SYSTEMS REQUIRING SHUT-DOWN TO PROPERLY ISOLATE ACTIVE PORTIONS OF THE SYSTEM FROM THE TARGETED INACTIVE PORTION OF THE SYSTEM. SHOULD ISOLATION VALVES NOT BE PRESENT, OR NOT BE FUNCTIONAL, THE OWNER SHALL BE NOTIFIED OF THE DEFICIENCY. IN ANY CASE, THE SHUT-DOWN SHALL STILL BE REQUIRED AND DEFICIENCIES OF THE EXISTING SYSTEM

(2) THE OWNER SHALL RESERVE THE RIGHT TO DICTATE FINAL TIME AND DATE OF ALL SHUTDOWNS. THE

CONTRACTOR SHALL PERFORM ALL SHUTDOWNS AT THE TIME AND DATE AS DIRECTED BY THE

- SHALL BE PLANNED AROUND. B. DAMAGE AND EMERGENCY REPAIRS (1) ASSUME RESPONSIBILITY FOR ANY DAMAGE CAUSED BY LEAKS IN THE PIPING SYSTEM BEING REWORKED UNDER THIS CONTRACT. REPAIR ALL DAMAGE WITHOUT EXTRA COST TO OWNER.
- RESTORE BUILDING, PIPING, INSULATION ETC. TO THEIR ORIGINAL CONDITION. (2) OWNER RESERVES THE RIGHT TO MAKE EMERGENCY REPAIRS AS REQUIRED TO KEEP EQUIPMENT IN OPERATION, WITHOUT VOIDING CONTRACTOR'S GUARANTEE OR RELIEVING HIM OF RESPONSIBILITY PART 6 - 22 01 20 SHOP DRAWINGS
- A. THIS CONTRACTOR SHALL REVIEW, STAMP WITH HIS APPROVAL AND SUBMIT, WITH REASONABLE PROMPTNESS AND IN ORDERLY SEQUENCE SO AS TO CAUSE NO DELAY IN THE WORK OR IN THE WORK OF ANY OTHER CONTRACTOR, ALL SHOP DRAWINGS AND SAMPLES REQUIRED BY THE CONTRACT DOCUMENTS
- B. SUBMISSION OF SHOP DRAWINGS WITHOUT CONTRACTOR REVIEW, SIGNATURE, AND APPROVAL SHALL BE CAUSE FOR REJECTION. SUCH SUBMITTALS SHALL BE RETURNED WITHOUT REVIEW. C. IF THE SUBMITTAL INCLUDES DEVIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS,
- THE CONTRACTOR SHALL CLEARLY NOTE THE DEVIATIONS "IN RED" ON THE SUBMITTAL D. INDICATE SPECIFIC OPTIONS OR ACCESSORIES ON SHOP DRAWINGS BY POINTING TO, CHECKING OFF, OR UNDERLINING. DO NOT USE HIGHLIGHTER. E. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD INFORMATION AS THE BASIS OF SHOP DRAWINGS. STANDARD INFORMATION PREPARED WITHOUT SPECIFIC REFERENCE TO THE PROJECT IS NOT
- CONSIDERED SHOP DRAWINGS AND WILL BE CAUSE FOR REJECTION. F. IN CHECKING SHOP DRAWINGS. THE ENGINEER AND ARCHITECT WILL MAKE EVERY EFFORT TO DETECT AND CORRECT ERRORS, OMISSIONS AND INACCURACIES IN SUCH DRAWINGS, BUT HIS FAILURE TO DETECT ERRORS, OMISSIONS AND INACCURACIES SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR THE PROPER AND COMPLETE INSTALLATION IN ACCORDANCE WITH THE INTENT OF
- G. WHERE ONLY ONE MAKE OF EQUIPMENT IS NAMED, IT SHALL BE PROVIDED AS SPECIFIED. H. VERBAL REQUESTS OF APPROVALS FOR ANY SUBSTITUTION WILL NOT BE BINDING ON THE ARCHITECT,
- I. ALL SUBMITTALS SHALL BE IN ELECTRONIC FORMAT. ELECTRONIC SUBMITTALS SHALL CONFORM TO THIS
- (1) ELECTRONIC SUBMITTALS SHALL BE IN PORTABLE DOCUMENT FORMAT (.PDF). (A) ELECTRONIC SUBMITTALS SHALL INCLUDE A TRANSMITTAL.

THE CONTRACT DOCUMENTS.

(4) PROJECT NAME

(6) CONTENTS OF SUBMITTAL

EXAMPLE: "PLUMBING FIXTURES"

(5) THAT THE E-MAIL CONTAINS A SUBMITTAL

22 01 40 PLUMBING OPERATIONS AND MAINTENANCE MANUAL

A. OPERATING AND MAINTENANCE MANUALS

CONTAINING THE FOLLOWING:

(A) PERFORMANCE DATA, RATINGS.

(B) MANUFACTURER'S DESCRIPTIVE LITERATURE.

(F) NAME OF SERVICE AGENCY AND INSTALLER.

<u>PART 7 -</u> 22 02 10 OWNER OPERATING AND MAINTENANCE TRAINING

INTERNATIONAL PLUMBING CODE AND THE LOCAL AUTHORITY.

SHALL BE PURGED AND THEN PLACED IN OPERATION, AS NECESSARY

AND APPROVED, IN ADVANCE, BY THE GENERAL CONTRACTOR

BE FILLED TO PROPER DEPTH WITH SAND AND THOROUGHLY TAMPED.

SHALL BE BANKRUN GRAVEL. INSTALL BACKFILL IN 6 INCH TAMPED LAYERS

WITH COMPLIANCE REPORT SUBMITTED TO ARCHITECT.

PART 10 - 22 10 10 COMMON PIPING REQUIREMENTS

OPERATING AND MAINTENANCE MANUAL

TO PROCEED WITHOUT DELAY.

OR GRAVEL CUSHION.

TESTED AND ACCEPTED.

PART 9 - 22 04 30 EXCAVATION TRENCHING, AND BACKFILL

PART 8 - 22 03 10 PIPING SYSTEM FLUSHING AND TESTING

(G) FINAL APPROVED SHOP DRAWINGS.

(I) WIRING DIAGRAMS

SEVEN DAYS PRIOR NOTICE

DURATION SHALL BE 6 HOURS.

22 01 50 RECORD DRAWINGS

(J) FINAL BALANCE REPORT.

(D) MANUFACTURER'S MAINTENANCE AND SERVICE MANUALS.

(B) E-MAIL SUBJECT LINE SHALL CLEARLY INDICATE

J. FAILURE TO CONFORM THE REQUIREMENTS ABOVE MAY RESULT IN REJECTION.

WHATEVER METHOD IS MOST CONVENIENT OR APPROPRIATE FOR THE PROJECT.

K. AT THE REVIEWER'S DISCRETION, THE REVIEWER HAS THE OPTION TO RETURN THE SUBMITTALS IN

(1) THIS CONTRACTOR SHALL SUPPLY THE OWNER WITH THREE (3) COPIES OF OPERATION MANUALS

(C) AUTOMATIC CONTROLS WITH DIAGRAMS AND WRITTEN DESCRIPTION OF OPERATION.

(H) STEP-BY-STEP PROCEDURES FOR START-UP AND SHUT-DOWN FOR EACH SYSTEM AND PIECE OF

(1) AS WORK PROGRESSES, RECORD IN RED INK ON A SET OF "AS-BUILT" PRINTS ANY DEVIATIONS FROM

DESIGN DRAWINGS. DELIVER TO THE OWNER BEFORE SUBMITTING REQUEST FOR FINAL PAYMENT.

INSTRUCTIONS FOR THE PURPOSE OF TRAINING OWNER'S PERSONNEL IN ALL PHASES OF OPERATION AND

MAINTENANCE OF EQUIPMENT AND SYSTEMS. SCHEDULE TRAINING WITH OWNER, PROVIDE AT LEAST

A. ALL DOMESTIC WATER SYSTEMS SHALL BE PRESSURE TESTED WITH POTABLE WATER TO 125 PSI. TEST

B. CHLORINATE ALL DOMESTIC WATER SYSTEMS AS FOLLOWS. FIRST FLUSH SYSTEM WITH CLEAN POTABLE

WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS. THEN FILL WITH A WATER/CHLORINE

SOLUTION (50PPM CHLORINE) AND ALLOW TO STAND FOR 24 HOURS. FOLLOWING STANDING TIM

REPEAT CHLORINATION, IF NECESSARY, UNTIL NO BACTERIOLOGICAL CONTAMINATION IS PRESENT IN THE

FLUSH THE SYSTEM WITH CLEAN POTABLE WATER UNTIL CHLORINE IS PURGED FROM THE SYSTEN

SYSTEM. PROCEDURE SHALL CONFORM TO AWWA C651 AND BE ACCEPTED BY THE LOCAL HEALTH

D. ALL GAS PIPING SYSTEMS SHALL BE INSPECTED AND PRESSURE TESTED. TESTING PROCEDURE SHALL

(OXYGEN SHALL NEVER BE USED). TEST DURATION SHALL BE 24 HOURS. PRIOR TO TESTING, THE

NTERIOR OF THE PIPE SHALL BE CLEARED OF ALL FOREIGN MATERIAL. ALL TESTING SHALL BE DONE

VITH DUE REGARD FOR THE SAFETY OF EMPLOYEES AND THE PUBLIC. AFTER A SUCCESSFUL PRESSUR TEST AND BEFORE THE SYSTEM IS PLACED IN OPERATION THE PIPING SYSTEM SHALL BE PURGED IN

JNATTENDED DURING PURGING. AFTER THE PIPING HAS BEEN PLACED IN OPERATION, ALL EQUIPMENT

MAINTENANCE MANUAL. A COPY OF A CERTIFICATE THAT THE DOMESTIC WATER SYSTEM CHLORINATION

SUPERVISION NECESSARY TO PROVIDE ALL EXCAVATING, TRENCHING, AND BACKFILLING REQUIRED FOR

THE INSTALLATION OF BELOW GROUND FIRE. GAS, WATER, STORM AND SANITARY PIPING IN COMPLIANCE

WITH THE REQUIREMENTS OF THE GOVERNING AUTHORITIES. DO NOT EXCAVATE UNTIL WORK IS READY

DEWATERING SYSTEM EQUIPMENT TO CONVEY WATER AWAY FROM EXCAVATIONS. LAY NO PIPE IN WATER.

LOCATIONS TO PROVIDE WORKING SPACE. ANY EXCAVATIONS DUG BELOW THE REQUIRED DEPTH SHALL

LAYER OF CRUSHED STONE OR GRAVEL. DO NOT SET PIPING DIRECTLY ON SOLID ROCK WITHOUT STONE

AND EACH LAYER OF BACKFILL FOR FILL MATERIAL AT 95% DENSITY FOR COHESION LESS SOILS AND 90%

DENSITY FOR COHESIVE SOIL MATERIAL. TEST TO BE PERFORMED BY AN INDEPENDENT TESTING SERVICE,

B. EXACT ROUTING OF TRENCHING SHALL BE DETERMINED BY THE CONTRACTOR PERFORMING THE WORK

E. EXCAVATE TO REQUIRED DEPTH AND EXACT SLOPE WITH ONLY SUFFICIENT DIRT REMOVED AT JOINT

F. WHERE ROCK IS ENCOUNTERED, EXCAVATE 6 INCHES BELOW REQUIRED DEPTH AND BACKFILL WITH A

G. AFTER PIPING IS INSTALLED, EXCAVATION SHALL BE KEPT OPEN UNTIL PIPING HAS BEEN INSPECTED,

H. BACKFILL WITH AN INITIAL 12 INCH LAYER OF SAND OVER THE PIPE. THE REMAINDER OF THE BACKFILL

I. CONTROL TRENCH SOIL COMPACTION DURING CONSTRUCTION. COMPACT TYPE TOP 12" OF SUBGRADE

A. PROVIDE PIPING MATERIALS AND FACTORY-FABRICATED PIPING PRODUCTS OF SIZES, TYPES, PRESSURE

RATINGS, TEMPERATURE RATINGS AND CAPACITIES AS DETERMINED BY INSTALLER TO COMPLY WITH

INSTALLATION REOUIREMENTS. PROVIDE SIZES AND TYPES MATCHING PIPING CONNECTIONS: PROVIDE

ITTINGS OF MATERIALS, WHICH MATCH PIPE MATERIALS USED IN PLUMBING SYSTEMS. WHERE MORE THAN ONE TYPE OF MATERIALS OR PRODUCTS ARE INDICATED. SELECTION IS INSTALLER'S OPTION.

HAS BEEN COMPLETED AND ACCEPTED BY THE LOCAL HEALTH DEPARTMENT SHALL BE INCLUDED IN THE

ACCORDANCE WITH NFPA 54 "NATIONAL FUEL GAS CODE". THE POINT OF DISCHARGE SHALL NOT BE LEFT

CONFORM TO THE LOCAL GAS UTILITY REQUIREMENTS AND THE LATEST "INTERNATIONAL FUEL GAS

CODE". TEST PRESSURE SHALL BE 1-1/2 TIMES THE PROPOSED MAXIMUM WORKING PRESSURE. BUT NO

LESS THAN 3 PSI, IRRESPECTIVE OF DESIGN PRESSURE. TEST MEDIUM SHALL BE AIR OR AN INERT GAS

C. ALL STORM AND SANITARY SEWERS SHALL BE INSPECTED AND TESTED AS REQUIRED BY THE

E. COPIES OF ALL CERTIFICATES OF INSPECTIONS SHALL BE INCLUDED IN THE OPERATING AND

A. EACH RESPECTIVE CONTRACTOR IS RESPONSIBLE TO FURNISH MATERIALS, TOOLS, LABOR, AND

THE "AS-BUILT" PRINTS SHALL BE AN ACCURATE DEPICTION OF THE PROJECT AS COMPLETED.

A. PROVIDE TO OWNER AFTER ALL EQUIPMENT IS IN OPERATION AND AT AN AGREEABLE TIME,

(E) SPARE PARTS AND REPLACEMENT PARTS LIST FOR EACH PIECE OF EQUIPMENT.

- (B) ALL PORTIONS OF THE ELECTRONIC SUBMITTAL SHALL BE BOUND IN A SINGLE .PDF FILE. (C) FILE SHALL BE NAMED TO MATCH SUBMITTAL NAME AS IT APPEARS IN THE SPECIFICATIONS.
- (D) SUBMITTALS SHALL SPECIFICALLY IDENTIFY ANY DEVIATIONS FROM THE CONTRACT DOCUMENTS. (2) ELECTRONIC SUBMITTALS SHALL INCLUDE A CONTRACTOR REVIEW STAMP THAT INDICATES REVIEW
- B. PIPE TO BE THREADED SHALL BE CUT SQUARE AND FULL THREADED WITH CLEAN-CUT TAPERING THREADS AND APPROVAL BY THE CONTRACTOR PRIOR TO SUBMISSION. AND SHALL BE REAMED AFTER THREADING. ALL THREADED CONNECTIONS SHALL BE MADE WITH PIPE COMPOUND APPLIED TO THE WALL THREADS ONLY (3) ELECTRONIC SUBMITTALS SHALL BE TRANSMITTED VIA AN E-MAIL: C. THE EDGES OF THE PIPE TO BE WELDED SHALL BE MACHINE BEVELED WHEREVER POSSIBLE. BEFORE (A) PROVIDE ONLY ONE SUBMITTAL PER E-MAIL
 - WELDING, THE SURFACES SHALL BE THOROUGHLY CLEANED. THE PIPING SHALL BE CAREFULLY ALIGNED NO METAL SHALL PROJECT WITHIN THE PIPE. MITERED JOINTS ARE PROHIBITED, ONLY FACTORY FORMED FITTINGS SHALL BE USED. FLANGES SHALL BE WELDING NECK TYPE. MITERING OF THE PIPE TO FORM ELBOWS OR NOTCHING OF PIPE TO FORM TEES SHALL NOT BE PERMITTEI

B. GENERAL - ALL PLUMBING PIPING AND FITTINGS SHALL BE CONSTRUCTED OF MATERIALS AS SPECIFIED IN

CONTROL), PROVIDE COMMERCIAL QUALITY FAUCETS, VALVES OR DISPENSING DEVICES OF TYPE AND

SIZE INDICATED AND AS REQUIRED TO OPERATE AS INDICATED. INCLUDE MANUAL SHUT-OFF VALVES

AND CONNECTING PIPES TO PERMIT OUTLET SERVICING WITHOUT SHUT-DOWN OF WATER SUPPLY PIPING

C. WATER OUTLETS: AT LOCATIONS WHERE WATER IS SUPPLIED (BY MANUAL, AUTOMATIC OR REMOTE

D. VACUUM BREAKERS: PROVIDE WITH FLUSH VALVES WHERE REQUIRED BY GOVERNING REGULATIONS,

E. P-TRAPS: INCLUDE REMOVABLE P-TRAPS (WITH CLEAN-OUT PLUG) WHERE DRAINS ARE INDICATED FOR

F. FIXTURE BOLT CAPS: PROVIDE MANUFACTURER'S STANDARD EXPOSED FIXTURE BOLT CAPS FINISHED TO

G. ESCUTCHEONS: WHERE FIXTURE SUPPLIES AND DRAINS PENETRATE WALLS IN EXPOSED LOCATIONS AND

BENEATH COUNTERS OR CABINETS PROVIDE CHROME-PLATED SHEET STEEL ESCUTCHEONS WITH

H. AERATORS: PROVIDE AERATORS OF TYPES APPROVED BY HEALTH DEPARTMENT HAVING JURISDICTION

I. UNIONS 2" AND SMALLER SHALL BE CAST BRASS, SOLDER ENDS WITH MACHINED AND LAPPED SEATS

J. COMPLY WITH ADDITIONAL FIXTURE REQUIREMENTS CONTAINED IN THE PLUMBING FIXTURE SCHEDULE

A. PROVIDE A SHUT-OFF VALVE, UNION AND TEE WITH FULL SIZED DIRT LEG (SEDIMENT TRAP) AT ALL

WITHIN RETURN AIR CEILING PLENUMS, SHALL NOT CONTAIN UNIONS OR SHUT-OFF VALVES.

G EXTEND GAS VENT PIPING THROUGH AN EXTERIOR WALL FLBOW DOWNWARD, INCREASE OPEN PIPE

DISCHARGE TWO PIPE SIZES LARGER THAN VENT SIZE, AND COVER OPEN DISCHARGE PIPE WITH A

H. ALL BLACK STEEL NATURAL GAS PIPE AND FITTINGS EXPOSED TO THE OUTDOORS SHALL BE PAINTED WITH

PRIMER, AND THEN TWO COATS OF RUST INHIBITED PAINT-COLOR AS SELECTED BY THE OWNER OR

A. GENERAL - ALL PLUMBING INSULATION SHALL BE CONSTRUCTED OF MATERIALS AS SPECIFIED IN THE

B. EACH CONTRACTOR SHALL FURNISH AND INSTALL ALL INSULATION NECESSARY TO THE PROJECT AND IN

A COMPOSITE (INSULATION, JACKET AND ADHESIVE) FIRE AND SMOKE HAZARD RATING AS TESTED

C. PROVIDE ALL INSULATION MATERIALS (INSULATION, JACKETS, FITTING COVERS, ADHESIVES, CEMENTS,

DEVELOPED 50. INSULATION SHALL BE RATED FOR INSTALLATION IN PLENUM CEILINGS.

INDEX OF 50 OR LESS, AS TESTED UNDER PROCEDURE ASTM E-84 (NFPA 255).

AEROCEL, ARMACELL, HALSTEAD, NOMACO, OR RUBATEX.

PRE-FABRICATED UV-RESISTANT PVC JACKET.

(B) TRUEBRO "HANDI LAV-GUARD"

(C) PLUMBEREX "PRO-2000" SERIES

COMPLY WITH ICC/ANSI A 117.1

MOVEMENT OF PIPING SUBJECT TO THERMAL EXPANSION

PART 13 - 22 12 20 PIPE HANGERS AND SUPPORTS:

ACCORDANCE WITH THE FOLLOWING SCHEDULE. ALL INSULATION AND ACCESSORIES USED SHALL HAVE

UNDER PROCEDURE ASTM E-84, NFPA 255 AND UL 723, NOT EXCEEDING A FLAME SPREAD 25 AND SMOKE

MASTICS, SEALERS AND FINISHES) WITH A FLAME-SPREAD INDEX OF 25 OR LESS AND SMOKE DEVELOPED

(1) ALL INSULATION WORK SHALL BE INSTALLED WHERE INDICATED IN THE INSULATION SCHEDULE AND

SHALL BE OF THE THICKNESS AND MATERIALS CONFORMING WITH THE INSULATION SCHEDULE.

E. PROVIDE FIBERGLASS INSULATION PRODUCTS AS MANUFACTURED BY OWENS CORNING, KNAUF, CERTAIN

G. IN ADDITION TO THE INSULATION AND NORMAL FINISH, ALL OUTDOOR PIPING SHALL BE COVERED WITH A

(1) PVC JACKET SHALL BE HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784,

(2) PROVIDE PVC JACKET ON ALL EXPOSED PIPING REQUIRED TO RECEIVE INSULATION (PIPING BELOW

(1) ACCEPTABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS; PROVIDE

(A) INSULATION KITS SHALL BE A MINIMUM OF 1/8" THICK MOLDED CLOSED CELL VINYL

ANTI-MICROBIAL/ANTI FUGAL. PROVIDE KIT WITH REMOVABLE VALVE ACCESS CAPS

A. PIPING SHALL BE CUT ACCURATELY TO MEASUREMENT AT THE SITE AND WORKED INTO PLACE WITHOUT

(B) UNITS SHALL BE BARRIER-FREE, AND SHALL BE INSTALLED PER ADA REQUIREMENTS AND SHALL

SPRINGING OR FORCING. SUFFICIENT OFFSETS, PIPE LOOPS, OF EXPANSION JOINTS BETWEEN ANCHOR

POINTS SHALL BE PROVIDED AS NEEDED, WHETHER OR NOT SHOWN, TO LIMIT STRESSES AND CONTROL

FINISHED CEILING; NOT CONCEALED ABOVE CEILINGS OR WITHIN WALLS).

INSULATION KITS AS MANUFACTURED BY ONE OF THE FOLLOWING:

(A) MCGUIRE MANUFACTURING COMPANY, INC. "PROWRAP"

F. PROVIDE CLOSED-CELL ELASTOMERIC AND POLYMERIC INSULATION PRODUCTS AS MANUFACTURED BY

E. BUSHINGS AND CAST IRON FITTINGS SHALL NOT BE UTILIZED IN NATURAL GAS PIPING.

F. GALVANIZED PIPE OR FITTINGS SHALL NOT BE UTILIZED FOR NATURAL GAS PIPING.

B. PORTION OF GAS PIPING SYSTEMS INSTALLED IN CONCEALED LOCATIONS (I.E., INSIDE STUD WALLS) OR

SUITABLE FOR 125 PSI WORKING PRESSURES. 2-1/2" AND LARGER SHALL HAVE FLANGED CONNECTIONS.

INCLUDING LOCATIONS WHERE WATER OUTLETS ARE EQUIPPED FOR HOSE ATTACHMENT.

THE PLUMBING PIPE AND FITTING SCHEDULE.

DIRECT CONNECTION TO DRAINAGE SYSTEM.

MATCH FIXTURE FINISH.

FRICTION SLIPS.

ON DRAWINGS.

PART 11 - 22 10 40 NATURAL GAS PIPING

NATURAL GAS EQUIPMENT CONNECTIONS

C. ELBOWS, TEES AND COUPLINGS ARE PERMITTED.

STAINLESS STEEL INSECT SCREEN.

<u>12 -</u> 22 11 10 PIPING INSULATION

TEED, OR JOHNS MANVILLE.

CLASS 16354-C.

(2) MATERIALS

H. PVC JACKETS

PLUMBING INSULATION SCHEDULE.

D. NATURAL GAS PIPING SHALL NOT BE USED AS A GROUNDING ELECTRODE.

- D. UNIONS OR FLANGES SHALL BE INSTALLED IN ALL CONNECTIONS TO EQUIPMENT, CONTROL VALVES, ETC. AS NECESSARY TO PERMIT REMOVAL OF EQUIPMENT AND SPECIALTIES FOR SERVICING, REPAIRING, OR CLEANING. IT SHALL BE POSSIBLE TO REMOVE ANY PIECE OF EQUIPMENT BE REMOVING ONLY ONE OR
- E. VALVES SHALL BE IN SUITABLE LOCATIONS AT EACH PIECE OF EQUIPMENT OR SECTION OF PIPING AS INDICATED OR REQUIRED FOR PROPER AND SAFE OPERATION OF EQUIPMENT AND TO FACILITATE MAINTENANCE AND/OR REMOVAL OF ALL EQUIPMENT. ON HORIZONTAL PIPE RUNS, INSTALL ALL VALVE STEAMS VERTICALLY WHERE POSSIBLE. IN NO CASE SHALL THE STEMS BE TURNED MORE THAN 90° FROM
- F. TAPS (HALF COUPLINGS OR TEES) SHALL BE PROVIDED AS NECESSARY TO PERMIT THE INSTALLATION OF TEMPERATURE CONTROL SENSORS, THERMOMETERS, PRESSURE GAUGES, AIR VENTS, ETC G. CONNECTIONS BETWEEN COPPER PIPING AND SCREWED FERROUS PIPING OR EQUIPMENT CONNECTIONS
- (1) FOR PIPE AND STATIONARY NON-ROTATING, NON VIBRATING EQUIPMENT CONNECTIONS 4" LONG (2) FOR ROTATING OR VIBRATING EQUIPMENT CONNECTIONS - CAST BRASS ADAPTER AND BRONZE FLANGES WITH DIELECTRIC SEPARATION OF FLANGES AND BOLTS.
- H. CONNECTION BETWEEN COPPER PIPING AND FLANGED FERROUS PIPING OR EQUIPMENT CONNECTIONS SHALL BE MADE USING BRONZE COMPANION FLANGE WITH DIELECTRIC SEPARATION OF FLANGES AND
- I. BRASS OR BRONZE VALVES IN FERROUS PIPING REQUIRE DIELECTRIC SEPARATION. J. ANY PIPING RESTING ON OR COMING IN CONTACT WITH BUILDING STRUCTURE SHALL BE INSULATED AT
- THAT POINT TO PREVENT THE TELEGRAPHING OF SOUND K. PIPING SYSTEMS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED BY CODE. RISER CLAMPS, CLEVIS HANGERS, SWIVEL LOOP HANGERS, OR TRAPEZE HANGERS MAY BE USED. ALL HANGERS, BRACKETS CLAMPS, ETC., SHALL BE OF STANDARD WEIGHT STEEL. PERFORATED STRAP HANGERS SHALL NOT BE USED IN ANY WORK. CLAMPS AND HANGERS IN DIRECT CONTACT WITH THE PIPE SHALL MATCH THE MATERIAL OF THE PIPE. HANGERS FOR INSULATED PIPING SYSTEMS SHALL NOT BE IN DIRECT CONTAC WITH THE PIPE. HANGERS FOR INSULATED PIPING SYSTEMS SHALL BE OVERSIZED TO ACCOMMODATE THE INSULATION AND SHALL INCLUDE AN INSULATION PROTECTION SHIELD WITH CALCIUM SILICATE OR
- WOOD BLOCK INSERT. INSULATION VAPOR BARRIER SHALL BE CONTINUOUS AT EACH HANGER L. PROVIDE MACHINE CUT STEEL PIPE SLEEVES 1" LARGER THAN OUTSIDE DIAMETER OF PIPE. WHERE FLOORS OR WALLS ARE CORE DRILLED. STEEL SLEEVES ARE NOT REOUIRED. EXTEND SLEEVES 4" HIGHER THAN FLOOR IN MECHANICAL ROOMS AND ALL ROOMS CONTAINING FLOOR DRAINS. SEAL OPENINGS TO
- MAINTAIN THE INTEGRITY OF THE FIRE RATING M. PROVIDE ALL INSERTS, FASTENERS AND SUPPORTS TO PROPERLY SUPPORT AND RETAIN PIPING; TO CONTROL EXPANSION, CONTRACTION, ANCHORAGE, DRAINAGE, AND PREVENT SWAY AND VIBRATION. PIPING SHALL BE SO SUPPORTED AS NOT TO PLACE A STRAIN ON VALVES, FIXTURES OR EQUIPMENT.
- N. THE DRAWINGS INDICATE THE GENERAL LOCATION AND ARRANGEMENT OF THE PIPING SYSTEMS. SO FAR AS PRACTICAL, INSTALL PIPING AS INDICATED, MAKING FINAL CONNECTIONS TO ALL EQUIPMENT AND FIXTURES. INSTALL PIPING AS DIRECT AS POSSIBLE AVOIDING UNNECESSARY OFFSETS. HOWEVER, IF OFFSETS ARE REOUIRED IN ORDER TO OBTAIN MAXIMUM HEADROOM OR TO AVOID CONFLICT WITH OTHER WORK, THEY SHALL BE MADE AS REQUIRED OR AS REQUESTED BY THE ARCHITECT/ENGINEER WITHOUT ADDITIONAL COST TO THE OWNER. THE ARCHITECT/ENGINEER RESERVES THE RIGHT TO MAKE MINOR CHANGES IN THE LOCATION OF PIPING AND EQUIPMENT DURING THE ROUGHING-IN, WITHOUT ADDITIONAL COST TO THE OWNER. ALL CHANGES PROPOSED BY OTHERS SHALL BE APPROVED BY THE ARCHITECT/ENGINEER
- O. INSTALL PIPING FREE OF SAGS OR BENDS P. ALL HYDRONIC PIPING SYSTEMS MUST BE INSTALLED SO THEY CAN BE COMPLETELY DRAINED. PROVIDE TEE FITTING WITH BALL VALVE WITH CAPPED HOSE THREAD FITTING AT ALL LOW POINTS, TRAPPED SECTIONS, BASES OF RISERS, AND ON EQUIPMENT SIDE OF SHUT OFF VALVES TO PERMIT DRAINING. ALL
- O. INSTALL BALL VALVE AIR VENTS AT ALL HIGH POINTS IN THE PIPING SYSTEMS NEEDED FOR COMPLETE AIR FLIMINATION FROM THE SYSTEM INSTALL AIR VENTS ON THE HIGH SIDE OF ALL FOLIDMEN CONNECTIONS ALL AIR VENTS SHALL BE ACCESSIBLE PROVIDE 3/8" SOFT COPPER TURING ON OUTLET OF AIR VENT VALVES TURNED 180 DEGREES DOWNWARD TO DISCHARGE CLEAR OF PIPE AND INSULATION R. PROVIDE ALL STOPS, SUPPLIES, TRAPS, ESCUTCHEONS, CARRIERS, ETC. REQUIRED FOR A COMPLETE
- S. TERMINATE PLUMBING VENT PIPES AT LEAST 12 INCHES ABOVE ROOF. T. WHERE HYDRONIC LINES ARE REDUCED IN SIZE, ECCENTRIC REDUCING FITTINGS SHALL BE USED TO
- ALIGN TOP OF MAINS AND PREVENT AIR POCKETS U. UL AND FM COMPLIANCE; HANGERS, SUPPORTS AND COMPONENTS SHALL BE LISTED AND LABELED BY UL AND FM WHERE USED FOR FIRE PROTECTION PIPING SYSTEMS. SUPPORT FIRE PROTECTION SYSTEMS PIPING INDEPENDENTLY FROM OTHER PIPING SYSTEMS.
- A. ALL CLEAN-OUTS IN SUSPENDED CAST IRON SEWERS SHALL BE CAST IRON NO-HUB WITH CAST BRONZE

SEALS, BLOWOUT-PROOF STEM, VINYL-COVERED STEEL HANDLE AND HAVE THREADED ENDS.

B. ALL FLOOR CLEAN-OUTS SHALL BE CAPABLE OF ADJUSTMENT TO MATCH FINISH SURFACE.

- C. ACCEPTABLE MANUFACTURERS: ZURN INDUSTRIES INC., JAY R. SMITH, WADE, JOSAM. C. MAINTAIN SIDES AND SLOPES OF EXCAVATIONS IN A SAFE CONDITION UNTIL COMPLETION OF PART 15 - 22 13 10 DOMESTIC WATER VALVES BACKFILLING. FOR DEEP EXCAVATIONS PROVIDE ALL REQUIRED SHORING AND BRACING A. BALL VALVES, 3" AND SMALLER, SHALL BE 600# WOG, 150# SWP, TWO-PIECE, FULL PORT CAST BRONZE D. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS. IF NECESSARY, PROVIDE AND MAINTAIN OR FORGED BRASS BODY, CHROME PLATED BRASS BALL, REPLACEABLE "TEFLON" OR "TFE" SEATS AND
 - (1) ACCEPTABLE MANUFACTURERS: HAMMOND, MILWAUKEE, STOCKHAM, NIBCO, APOLLO OR WATTS. B. HORIZONTAL SWING CHECK VALVES 2" AND SMALLER SHALL HAVE BRONZE BODY, BRONZE DISC, HORIZONTAL SWING TYPE WITH THREADED ENDS, 300 PSI CWP. (1) ACCEPTABLE MANUFACTURERS: CRANE, HAMMOND, JENKINS, MILWAUKEE, NIBCO, OR STOCKHAM.
 - PART 16 22 13 11 DOMESTIC WATER MIXING VALVES A. INDIVIDUAL-FIXTURE TYPE: (1) PROVIDE BELOW DECK THERMOSTATIC WATER MIXING VALVE FOR USE WITH A SINGLE ELECTRONIC
 - (2) THERMOSTATIC WATER MIXING VALVE SHALL HAVE THE FOLLOWING FEATURES: (A) DESIGNED FOR UNDER-THE-LAVATORY APPLICATIONS WHERE THE OUTLET TEMPERATURE OF HOT WATER MUST BE CONTROLLED FOR SAFE, ECONOMIC USE. (B) INSTALLS IN PLACE OF THE TEE FITTING SUPPLIED WITH THE FAUCET PRIOR TO THE SOLENOID
 - (C) DESIGNED TO QUICKLY SENSE AND COMPENSATE FOR TEMPERATURE FLUCTUATIONS INDUCED BY WATER TEMPERATURE AND PRESSURE CHANGES IN THE SUPPLY LINE. (D) WATER TEMPERATURE ADJUSTMENT STEM WITH LOCK NUT TO PREVENT TAMPERING. (E) EQUIPPED WITH INTEGRAL CHECK VALVES AT INLETS.

- (F) STANDARDS: COMPLIES WITH PERFORMANCE STANDARDS ASSE 1070 AND CSA B125 FOR THERMOSTATICALLY CONTROLLED WATER TEMPERING VALVE.
- (G) PRESSURE RATING: 125 PSIG MINIMUM.
- (H) BODY: BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONENTS.
- (I) TEMPERATURE CONTROL: ADJUSTABLE 80-120°F RANGE.
- (J) INLETS AND OUTLET: THREADED OR 3/8" COMPRESSION CONNECTIONS.
- (K) FINISH: ROUGH OR CHROME-PLATED BRONZE.
- (L) TEMPERED-WATER SETTING: 120 DEG F. (M) TEMPERED-WATER DESIGN FLOW RATE: 4.0 GPM.
- (N) MINIMUM FLOW: 0.5 GPM. (3) ACCEPTABLE MANUFACTURERS (INDIVIDUAL-FIXTURE): APOLLO VALVES; ARMSTRONG INTERNATIONAL, INC.; CONBRACO INDUSTRIES, INC.; LAWLER MANUFACTURING COMPANY, INC.;
- LEONARD VALVE COMPANY; MOEN; POWERS (A WATTS INDUSTRIES CO.); SLOAN; WATTS INDUSTRIES, INC. (WATER PRODUCTS DIV.); ZURN PLUMBING PRODUCTS GROUP (WILKINS DIV.).
- B. PRIMARY THERMOSTATIC MIXING VALVES (FOR MULTIPLE FIXTURES) (1) THERMOSTATIC WATER MIXING VALVE SHALL HAVE THE FOLLOWING FEATURES:
- (A) STANDARD: ASSE 1016, 1017, 1069, AND 1070.
- (B) PRESSURE RATING: 125 PSIG (C) TYPE: [EXPOSED-MOUNTING] [CABINET-TYPE], THERMOSTATICALLY CONTROLLED WATER MIXING
- (D) MATERIAL: BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONENTS. (E) CONNECTIONS: THREADED [UNION] INLET AND OUTLET
- (F) ACCESSORIES: MANUAL TEMPERATURE CONTROL, CHECK STOPS ON HOT- AND COLD-WATER SUPPLIES, AND ADJUSTABLE, TEMPERATURE-CONTROL HANDLE.
- (G) VALVE PRESSURE RATING: 125 PSIG MINIMUM
- (H) TEMPERED-WATER SETTING: 120 DEG F (I) TEMPERED-WATER DESIGN FLOW RATE: ___ GPM
- (J) SELECTED VALVE FLOW RATE AT 5-PSIG PRESSURE DROP: ___ GPM (K) VALVE FINISH: [CHROME PLATED] [POLISHED, CHROME PLATED] [ROUGH BRONZE].
- (L) PIPING FINISH: [CHROME PLATED] [COPPER]. (M) CABINET: FACTORY-FABRICATED, STAINLESS STEEL, FOR [RECESSED] [SURFACE] MOUNTING AND WITH HINGED, STAINLESS-STEEL DOOR.
- (2) ACCEPTABLE MANUFACTURERS: LAWLER MFG; LEONARD VALVE CO.; POWERS PROCESS CONTROLS; SYMMONS INDUSTRIES, INC. C. MASTER THERMOSTATIC WATER MIXING VALVE ASSEMBLIES
- (1) MASTER THERMOSTATIC WATER MIXING VALVE SHALL HAVE THE FOLLOWING FEATURES: (A) DESCRIPTION: PROVIDE FACTORY-FABRICATED, [CABINET-TYPE] [EXPOSED-MOUNTING] THERMOSTATICALLY CONTROLLED, WATER-MIXING-VALVE ASSEMBLIES IN [TWO] [THREE]-VALVE PARALLEL ARRANGEMENT. THERMOSTATIC WATER MIXING VALVES SHALL INCLUDE COPPER
- ENCAPSULATED PARAFFIN-BASED THERMOSTAT, LOCKING TEMPERATURE REGULATOR HANDLE. INTEGRAL HOT AND COLD SUPPLY CHECKSTOPS, INTEGRAL WALL SUPPORT, AND INTERNAL PARTS OF BRASS, BRONZE, AND STAINLESS STEEL CONSTRUCTION. FINISH SHALL BE ROUGH BRONZE. (B) THERMOSTATIC MIXING VALVES SHALL COMPLY WITH ASSE 1017. INCLUDE CHECK STOPS ON
- (C) WATER REGULATOR(S) SHALL COMPLY WITH ASSE 1003. INCLUDE PRESSURE GAGE ON INLET AND OUTLET. (D) COMPONENT PRESSURE RATING SHALL BE 125 PSIG MINIMUM.
- (E) CABINET: FACTORY-FABRICATED, STAINLESS STEEL, FOR [RECESSED] [SURFACE] MOUNTING AND WITH HINGED, STAINLESS-STEEL DOOR.

HOT- AND COLD-WATER INLETS AND SHUTOFF VALVE ON OUTLET.

- (F) TEMPERED-WATER SETTING: 120 DEG F (G) UNIT TEMPERED-WATER DESIGN FLOW RATE: GPM
- (H) UNIT MINIMUM TEMPERED-WATER DESIGN FLOW RATE: 5 GPM (I) MIXING VALVES SHALL NOT BE DEPENDENT UPON A CIRCULATING PUMP TO ACHIEVE MINIMUM
- (J) MIXING VALVES SHALL BE ASSE LISTED AND 3RD PARTY CERTIFIED AS LEAD FREE. (2) ACCEPTABLE MANUFACTURERS: LAWLER MANUFACTURING CO.; LEONARD VALVE CO.; POWERS (A WATTS INDUSTRIES CO.); SYMMONS INDUSTRIES, INC.
- PART 17 22 13 20 NATURAL GAS VALVES D. NATURAL GAS SHUT-OFF VALVES 2" AND SMALLER SHALL BE FORGED BRASS OR BRONZE BODY, FULL PORT BALL VALVES WITH LEVER HANDLE, PTFE SEATS, CHROME PLATED BRASS BALL AND THREADED ENDS, 600 PSI CWP. WITH 5 PSIG PRESSURE LIMIT. PROVIDE ALL VALVES WITH A REMOVABLE WRENCH TO MATCH OPERATOR SQUARE HEAD SIZE. WRENCHES SHALL BE LOCKED IN PLACE WITH A SET SCREW.
- (1) ACCEPTABLE MANUFACTURERS: APOLLO, MILWAUKEE OR NIBCO. E. NATURAL GAS VALVES 2-1/2" AND LARGER SHALL BE 175# WOG, CAST IRON, FLANGED BODY PATTERN. VALVES SHALL BE UL LISTED FOR GAS SERVICE. VALVES SHALL BE KEY PORT VALVES SERIES 425 WITH RS-49" PLUG, SEALS AND LEVER HANDLE,PROVIDE ALL VALVES WITH A REMOVABLE WRENCH TO MATCH OPERATOR SQUARE HEAD SIZE. WRENCHES SHALL BE LOCKED IN PLACE WITH A SET SCREW.
- PART 18 22 13 21 NATURAL GAS PRESSURE REGULATORS A. ALL NATURAL GAS SYSTEMS SHALL COMPLY WITH THE LATEST "INTERNATIONAL FUEL GAS CODE" AND LOCAL UTILITY REQUIREMENTS. GAS REGULATORS SHALL BE ANSI Z21.18 CERTIFIED.

(1) ACCEPTABLE MANUFACTURERS: DEZURIK, KEYSTONE, OR RESUN.

- (1) REGULATORS SHALL BE CAPABLE OF REGULATING GAS LINE PRESSURE FROM INLET VALUE TO OUTLET VALUE AS SCHEDULED ON DRAWINGS (2) REGULATORS SHALL, AT A MINIMUM, BE CAPABLE OF PASSING THE SCHEDULED REQUIRED CAPACITY
- OF GAS AT THE SCHEDULED MAXIMUM PRESSURE DROP (3) REGULATORS SHALL BE PROTECTED FROM OVER-PRESSURIZATION WITH AN INTEGRAL PRESSURE (4) REGULATORS SHALL BE CAPABLE OF MULTI-POISE MOUNTING.
- (5) REGULATORS SHALL PROVIDE POSITIVE DEAD-END LOCK UP. (1) REGULATOR BODY SHALL BE CONSTRUCTED OF HIGH TENSILE STRENGTH CAST IRON.
- (2) ORIFICE SHALL BE CONSTRUCTED OF BRASS. (3) REGULATOR SEAT SHALL BE CONSTRUCTED OF BUNA-N OR SILICONE (FOR TEMPERATURES BELOW (4) DIAPHRAGM SHALL BE CONSTRUCTED OF BUNA-N AND NYLON.
- (5) HOUSING SHALL BE DIE CAST ALUMINUM. D. CONNECTIONS
- (1) FURNISH WITH FLANGED INLET AND DISCHARGE PIPE CONNECTIONS, OF SIZES AS INDICATED ON (2) IF NOT INDICATED, PROVIDE BOTH INLET AND DISCHARGE SIZES SHALL BE EQUAL TO THE DOWNSTREAM PIPE SIZE.
- (1) WHERE REGULATORS ARE INSTALLED INDOORS. PIPE REGULATOR EXCESS PRESSURE VENTED DIRECTLY TO THE OUTDOORS WITH A DEDICATED PIPE. PIPE SHALL BE FULL DISCHARGE CONNECTION SIZE. PIPE SHALL NOT BE COMBINED INSIDE THE BUILDING WITH ANY OTHER VENT PIPING. (2) ALL SPECIALTIES INSTALLED OUTDOORS SHALL BE PAINTED WITH PRIMER, AND THEN TWO COATS OF

(3) ALL REGULATORS SHALL BE SEPARATELY VENTED FULL SIZE TO THE EXTERIOR, WITH A TURNDOWN

ELBOW AND INSECT SCREEN. VENT OUTLET SHALL NOT TERMINATE WITHIN 20 FEET OF A COMBUSTION OR FRESH AIR INTAKE F. ACCEPTABLE MANUFACTURERS: ACTARIS, ITRON, MAXITROL, SCHUMBERGER, SPRAGUE, NORGAS. PART 19 - 22 14 20 DUAL CHECK BACKFLOW PREVENTERS

ST INHIBITED PAINT-COLOR AS SELECTED BY THE ARCHITECT

ACETYL RESIN AND PPO, WITH SILICONE DISC AND BUNA 'N' SEALS, STAINLESS STEEL SPRING. CHECK MODULES SHALL BE REPLACEABLE. PART 20 - 22 15 11 HYDRONIC MANUAL BALANCING VALVES A. MANUAL BALANCING VALVES 2" AND SMALLER SHALL HAVE BRONZE BODY WITH COMBINATION VENTURI

A. DUAL CHECK VALVES: COST BRONZE BODY WITH PLASTIC CHECK MODULES, INJECTION MOLDED WITH

- AND BALL VALVE WITH LEVER HANDLE, MEMORY STOP, TWO P/T PORTS, INLET UNION CONNECTION AND B. ACCEPTABLE MANUFACTURERS: BELL & GOSSETT, FLOW DESIGN INC., GRISWOLD, OR NEXUS.
- <u>PART 21 -</u> 22 17 30 STRAINERS A. STRAINERS SHALL BE Y-TYPE, BRONZE BODY, THREADED ENDS, BRASS PLUG, STAINLESS STEEL SCREEN WITH # 20 MESH, 200 WOG AT 150°F.
- PART 22 22 20 10 EQUIPMENT AND PIPING IDENTIFICATION A. LABEL ALL PIPING SYSTEMS WITH PIPE MARKERS INSTALLED ADJACENT TO VALVES, WHERE PIPES PASS THROUGH WALLS OR FLOORS, NEAR ALL BRANCHES AND CHANGES OF DIRECTION, AT 20 FEET INTERVALS ON STRAIGHT RUNS OF PIPE, AND AT ACCESS DOOR LOCATIONS. ALL PIPE MARKERS SHALL CONFORM TO ANSI A13.1 "SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS".
- B. PROVIDE CLEAR STICKER ON CEILING T-BAR TO INDICATE ACCESS LOCATION FOR EACH FAN POWERED BOX AND VAV TERMINAL BOX. C. THE CONTRACTOR SHALL FURNISH AND INSTALL A SYSTEM OF NAMEPLATES OR STENCILS DESIGNED TO IDENTIFY EACH PIECE OF EQUIPMENT (1) NAMEPLATE LETTERS AND NUMBERS SHALL MATCH EQUIPMENT DESIGNATION AS INDICATED ON THE
- (2) NAMEPLATES SHALL BE LAMINATED PHENOLIC WITH BLACK SURFACE AND WHITE CORE. USE 1/16" THICK MATERIAL FOR PLATES UP TO 2" BY 4". FOR LARGER SIZES USE 1/8" THICK. LETTERS AND NUMBERS SHALL BE A MINIMUM OF 1/2" HIGH.
- (3) FASTEN NAMEPLATES TO ALL EQUIPMENT BY THE USE OF STAINLESS STEEL SHEET METAL SCREWS. PART 23 - 22 21 20 STORAGE-TYPE ELECTRIC HOT WATER HEATERS D. GENERAL: PROVIDE AUTOMATIC, COMMERCIAL, ELECTRIC WATER HEATER WITH VERTICAL, ASME
- LABELED, 150 PSIG RATED STORAGE TANK, INTEGRAL CONTROLS, DRAIN VALVE AND AGA/ASME TEMPERATURE AND PRESSURE RELIEF VALVE. E. TANK: GLASS-LINED STEEL WITH ANODE RODS AND DRAIN VALVE. F. HEATING ELEMENTS: SCREW-IN OR FLANGED BOLT-IN IMMERSION TYPE, IN MULTIPLE OF 3 ELEMENTS.
- G. CONTROLS: ADJUSTABLE IMMERSION THERMOSTAT H. SAFETY CONTROLS: AUTOMATIC, HIGH-TEMPERATURE-LIMIT CUTOFF AND LOW WATER CUTOFF. I. TEMPERATURE AND PRESSURE RELIEF VALVE: ASME RATED AND LABELED.

J. ELECTRICAL CHARACTERISTICS: AS SCHEDULED ON DRAWINGS. ELECTRICAL CONTRACTOR TO PROVIDE

- K. WARRANTY: PROVIDE A 3-YEAR LIMITED WARRANTY. L. ACCEPTABLE MANUFACTURERS: RHEEM WATER HEATER DIV., CITY INVESTING CO.; RUUD WATER HEATER DIV., CITY INVESTING CO.; SMITH CORP. (A.O.). CONSUMER PRODUCTS DIV.; STATE INDUSTRIES, INC.;
- PART 24 22 24 20 RECIRCULATION PUMPS A. DOMESTIC HOT WATER CIRCULATORS SHALL BE IN-LINE TYPE, BRONZE BODY AND FLANGES WITH
- DYNAMICALLY AND ONE-PIECE HYDRAULICALLY BALANCED BRONZE IMPELLER, SUITABLE FOR USE IN DOMESTIC WATER SYSTEMS. B. THE CIRCULATOR SHALL HAVE A SELF-LUBRICATING, MAINTENANCE FREE DESIGN WITH A TELD-SERVICEABLE AND REPLACEABLE CARTRIDGE. THE CARTRIDGE SHALL CONTAIN ALL THE MOVING PARTS AND NO MECHANICAL SEAL SHALL BE REQUIRED.

SHALL BE FURNISHED WITH BUILT-IN OVERLOAD PROTECTION.

REGULATIONS.

D. ACCEPTABLE MANUFACTURERS: BELL + GOSSETT, PACO, TACO, GRUNDFOS. PART 25 - 22 40 00 PLUMBING FIXTURES A. PROVIDE FACTORY-FABRICATED PLUMBING FIXTURES OF TYPE, STYLE AND MATERIAL INDICATED. FOR EACH TYPE FIXTURE, PROVIDE FIXTURE MANUFACTURER'S STANDARD TRIM, CARRIER, SEATS AND VALVES AS SHOWN BY THEIR PUBLISHED PRODUCT INFORMATION AND INDICATED IN THE PLUMBING FIXTURES

C. MOTOR SHALL BE RESILIENT MOUNTED, OPEN-DRIP PROOF ENCLOSURE TYPE. SINGLE PHASE MOTORS

SCHEDULE, EITHER AS DESIGNED AND CONSTRUCTED OR AS RECOMMENDED BY MANUFACTURER AND AS

REOUIRED FOR COMPLETE INSTALLATION. WHERE MORE THAN ONE TYPE IS INDICATED, SELECTION IS

WHERE TYPE IS NOT OTHERWISE INDICATED, PROVIDE FIXTURES COMPLYING WITH GOVERNING

INSTALLER'S OPTION. BUT ALL FIXTURES OF SAME TYPE MUST BE FURNISHED BY SINGLE MANUFACTURER.

- B. PROVIDE VACUUM BREAKERS AS PART OF THE FIXTURE TRIM WHEREVER THERE IS A POSSIBILITY OF BACK C. PROVIDE FIXTURES CONSTRUCTED OF VITREOUS CHINA WITH ALL VISIBLE SURFACES GLAZED. FURNISH
 - ENAMELED CAST IRON FIXTURES CONSTRUCTED WITH NON-STAINING, ACID RESISTANT, PORCELAIN ENAMELED COAT THOROUGHLY FUSED ON THE SURFACES. FURNISH STAINLESS STEEL SINKS WITH SATIN
- D. PROVIDE ALL STOPS, SUPPLIES, TRAPS, AND ESCUTCHEONS NECESSARY FOR A COMPLETE INSTALLATION. ALL COMPONENTS SHALL BE CHROME PLATED BRASS.
- E. STOPS SHALL BE STRAIGHT OR ANGLE TYPE AS REQUIRED BY THE INSTALLATION, WITH LOOSE KEY, METAL STEM AND WASHER CUP WITH SET SCREW WASHER RETAINER.
- F. SUPPLIES SHALL BE FLEXIBLE CHROME PLATED COPPER. G. TRAPS SHALL BE 17 GAUGE CHROME PLATED BRASS WITH CLEAN-OUT PLUG. FURNISH WITH SLIP NUTS, WALL BEND AND ESCUTCHEON.

H. PROVIDE CARRIERS AND SUPPORTS AS REQUIRED FOR PROPER FIXTURE INSTALLATION. TYPE SHALL

PERMIT FIELD ADJUSTMENT TO FIT VARIATIONS IN CONSTRUCTION. UNLESS NOTED OTHERWIS

- SUPPORT ALL WALL MOUNTED PLUMBING FIXTURES ON CONCEALED CHAIR CARRIERS WITH FOOT I. PROVIDE FAUCET AERATORS AND OUTLETS OF TYPES APPROVED BY THE LOCAL HEALTH DEPARTMENT. J. INSULATE ALL EXPOSED WATER SUPPLIES AND TRAPS WHERE FIXTURES ARE INDICATED TO COMPLY WITH THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT. INSULATION KITS SHALL BE 3/16"
- K. PROVIDE ALL DRAINS INSTALLED IN WATERPROOF SLABS WITH FLASHING RING, WITH 30 INCH BY 30 INCH, 6 POUND LEAD FLASHING PROPERLY FASTENED TO THE FLASHING RING. PROVIDE ALL FLOOR DRAINS WITH "P" TRAPS WITH TRAP PRIMER CONNECTION. FURNISH ALL TRAPS 3 INCH DIAMETER OR LESS, INSTALLED ABOVE GRADE, WITH CLEAN-OUT PLUGS. L. ROOF DRAIN OUTLET CONNECTION SHALL BE THREADED OR NO-HUB TYPE. CAULKING OR GASKET TYPE

THICK MOLDED CLOSED CELL VINYL CONSTRUCTION WITH PVC SATIN WHITE COVER.

- 22 40 10 VITREOUS CHINA FIXTURES M. VITREOUS CHINA PLUMBING FIXTURES (I.E., WATER CLOSETS, URINALS AND LAVATORIES) AND
- CARRIERS: (1) ACCEPTABLE MANUFACTURERS:
- (A) AMERICAN STANDARD (U.S. PLUMBING PRODUCTS), CRANE PLUMBING/FIAT PRODUCTS, SLOAN, ELJER PLUMBINGWARE DIV. (A HOUSEHOLD INTERNATIONAL CO.), KOHLER COMPANY. N. PLUMBING TRIM:
- (1) ACCEPTABLE MANUFACTURERS: (A) AMERICAN STANDARD, CHICAGO FAUCET COMPANY, CRANE PLUMBING/FIAT PRODUCTS, ELJER PLUMBINGWARE DIV. (A HOUSEHOLD INTERNATIONAL CO.), KOHLER COMPANY, ROYAL BRASS MANUFACTURING COMPANY, SLOAN, SPEAKMAN COMPANY.
- O. FIXTURE SEATS (1) ACCEPTABLE MANUFACTURERS: (A) BEMIS MANUFACTURING COMPANY, BENEKE CORPORATION, CHURCH SEAT COMPANY, KOHLER
- COMPANY, SLOAN, OLSONITE CORPORATION (OLSONITE SEATS). A. ACCEPTABLE MANUFACTURERS: STERN WILLIAMS, MUSTEE
- PART 26 22 40 50 ELECTRIC WATER COOLERS B. PROVIDE ELECTRIC BI-LEVEL WATER COOLERS AS INDICATED AND SCHEDULED ON THE DRAWINGS, ALL WATER COOLERS SHALL BE CONSTRUCTED WITH HEAVY-GAUGE GALVANIZED STEEL FRAME AND STAINLESS STEEL TOP. UNITS SHALL INCLUDE FRONT AND SIDE PUSH PADS TO ACTIVATE THE FLOW WATER. BASIN SHALL BE DESIGNED TO ELIMINATE SPLASHING AND STANDING WATER. CABINET FINISH SHALL BE POWDER-COATED PAINT OR BAKED ENAMEL OF COLOR AS SELECTED BY ARCHITECT. BUBBLE GUARDS SHALL BE CONSTRUCTED OF PLASTIC AND OPERATE BETWEEN 20 AND 80 PSIG. ALL MATERIALS OF CONSTRUCTION ON CONTACT WITH DOMESTIC WATER SHALL BE LEAD-FREE AND SHALL UTILIZE REFRIGERANT 134A. WATER COOLERS SHALL COMPLY WITH ANSI A117.1 AND SHALL BE LISTED BY

UNDERWRITER'S LABORATORIES AND SHALL BE CERTIFIED TO NSF/ANSI STANDARD 61, ANNEX G

A. ACCEPTABLE MANUFACTURERS: ELKAY MANUFACTURING COMPANY, JUST MANUFACTURING COMPANY

- (AB1953). WATER COOLER COMPRESSORS SHALL BE WARRANTED FOR FIVE (5) YEARS. C. WHERE INDICATED, UNITS SHALL BE BARRIER-FREE, AND SHALL BE INSTALLED PER ADA REQUIREMENTS. D. ACCEPTABLE MANUFACTURERS: ELKAY, HALSEY, OASIS
- 22 40 92 EMERGENCY EYEWASH STATIONS A. ACCEPTABLE MANUFACTURERS: KEWAUNEE, GUARDIAN EQUIPMENT, SPEAKMAN
- A. SPRAY HEAD ASSEMBLY: 1. 1.6-GPM FLOW CONTROL ORIFICES MOUNTED ON A CHROME PLATED BRASS EYEWASH ASSEMBLY. 2. TWO SPRAY HEADS. EACH HEAD SHALL HAVE A "FLIP TOP" DUST COVER, INTERNAL FLOW CONTROL AND FILTER TO REMOVE IMPURITIES FROM THE WATER FLOW.
- 11-3/4" DIAMETER ABS PLASTIC. C. ANSI-COMPLIANT IDENTIFICATION SIGN.

PART 27 - 22 41 10 DRAINS AND TRAP PRIMERS

B. COMPONENTS:

OUTLETS ARE NOT ACCEPTABLE.

22 40 20 STAINLESS STEEL SINKS

- AY-OPEN BALL VALVE. VALVE SHALL BE US-MADE WITH CHROME PLATED BRASS BALL AND TEFLON SEALS.
- WATER TEMPERING VALVE: a. FURNISH WITH THERMOSTATIC MIXING VALVE PRECISELY BLENDS HOT AND COLD WATER TO DELIVER WARM (TEPID) WATER AS PROVIDED BY ANSI Z358.1 - 2014 b. THERMOSTATIC MIXING VALVE (FACTORY SET TO 85 DEGREES) FOR SINGLE EMERGENCY EYE

E. HEAVY DUTY CAST ALUMINUM WALL BRACKET WITH CORROSION RESISTANT POWDER COATED FINISH.

- WASH. UNIT SHALL INCLUDE A BUILT-IN COLD WATER BY-PASS, ROUGH BRONZE FINISH, SOLID BIMETAL THERMOSTAT, LOCKING TEMPERATURE REGULATOR WITH LIMIT STOP FACTORY SET FOR 90 DEGREES, INTEGRAL CHECK STOPS, AND DIAL THERMOMETER. PERFORMANCE: UNIT SHALL HAVE A FLOW RANGE OF 0.5-GPM TO 5-GPM WITH A MAXIMUM
- PRESSURE LOSS OF 20-PSI AND COME WITH A FULL 1-YEAR WARRANTY d. QUALITY ASSURANCE: UNIT SHALL BE CERTIFIED TO ASSE 1071. UNIT SHALL BE CERTIFIED O MEET LOW LEAD REQUIREMENTS OF WETTED SURFACE AREA CONTAINING LESS THAN PROVIDE CHROME PLATED BRASS TAILPIECE AND TRAP WITH 1-1/2" WASTER CONNECTION.

A. TRAP PRIMER VALVES SHALL HAVE CORROSION RESISTANT BRASS BODY. 1/2" THREADED INLET AND

OUTLET, WITH BACKFLOW PREVENTER SEAL AND VACUUM BREAKER PORT. UNIT TO CONTAIN NO SPRINGS

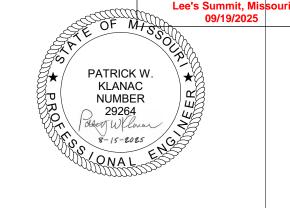
OR DIAPHRAGMS. "O" RING SEALS TESTED FOR RELIABILITY AT A TEMPERATURE RANGE OF -40° TO

(1) ACCEPTABLE MANUFACTURERS: JOSAM, JAY R. SMITH, PRECISION PLUMBING PRODUCTS, WADE, OR

- 450°F. DESIGNED TO AUTOMATICALLY ACTIVATE WHEN THE DOMESTIC WATER SYSTEM PRESSURE DROPS. AS LITTLE AS 5 PSI. PROVIDE WITH DISTRIBUTION UNIT AND SUPPLY TUBE FOR MULTIPLE (MAXIMUM OF 4) FLOOR DRAIN INSTALLATION
- B. FLOOR DRAINS AND ROOF DRAINS: (1) ACCEPTABLE MANUFACTURERS: JOSAM, JAY R. SMITH COMPANY, TYLER PIPE (SUB. OF TYLER

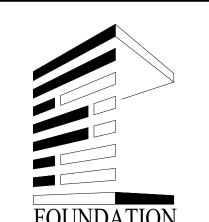
CORPORATION/WADE), ZURN INDUSTRIES INC

PATRICK W. KLANA(NUMBER 29264 dear Welm 8-15-2025



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As Noted on Plans Review





Akron, Ohio 44333

Phone: 330-666-3702

ptaengineering.com

PROJECT:

MARK: ISSUE: ISSUED

08/15/2025

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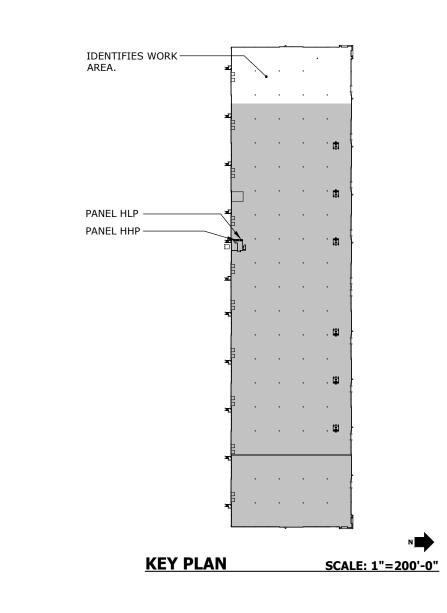
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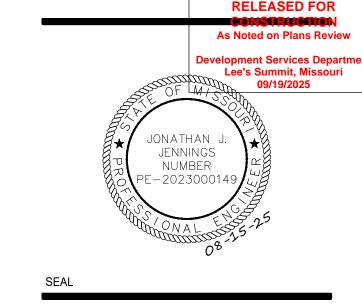
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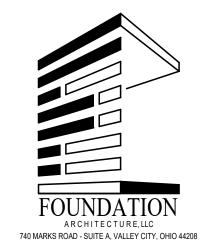
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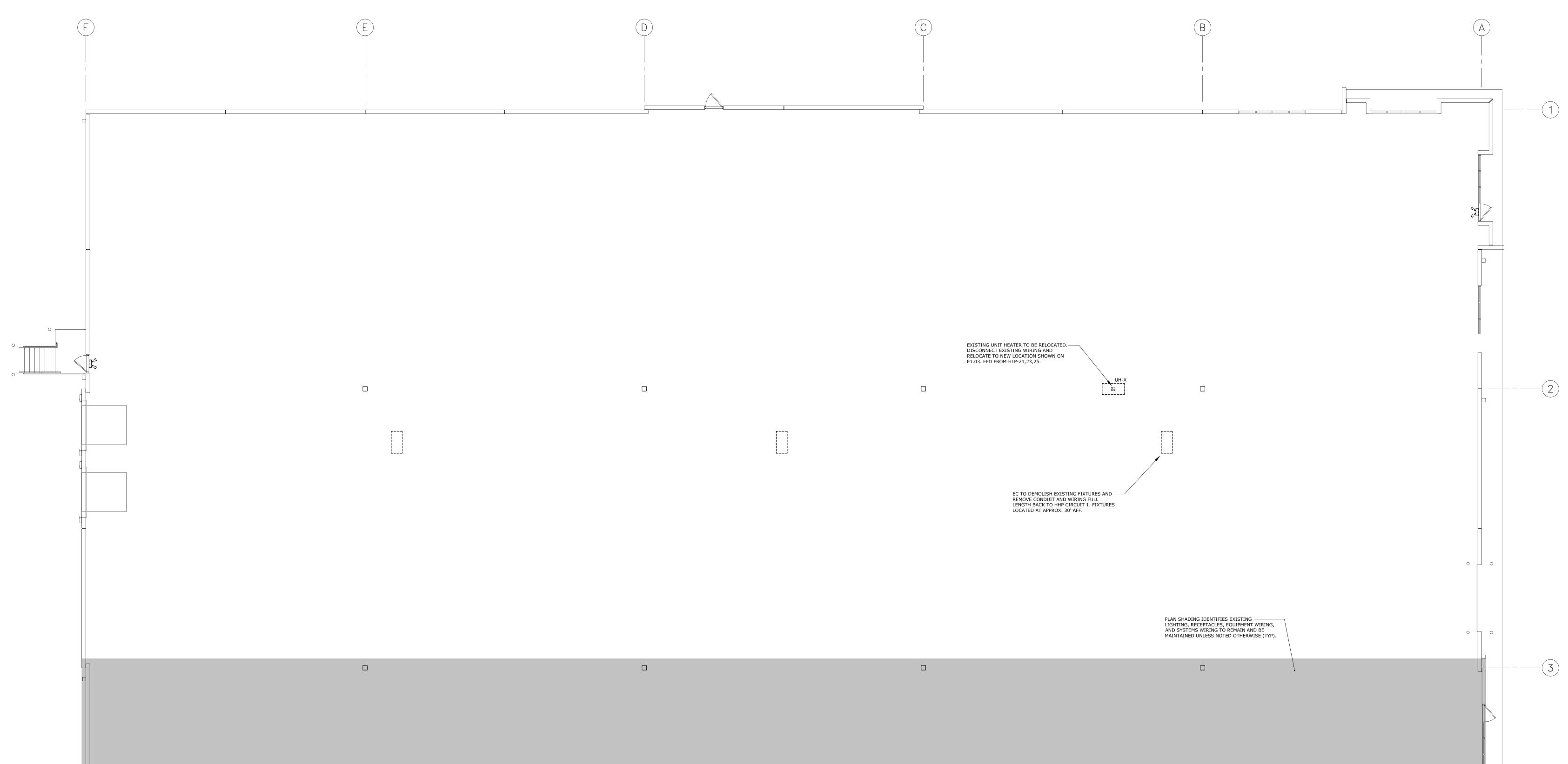
SPECIFICATIONS











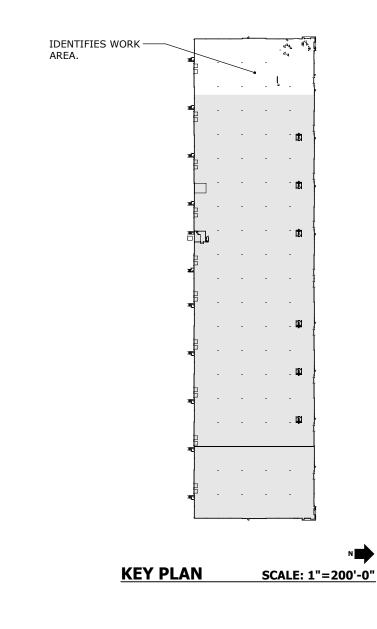
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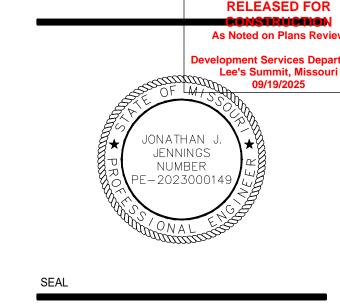
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ELECTRICAL DEMOLITION PLAN

ELECTRICAL DEMOLITION PLAN



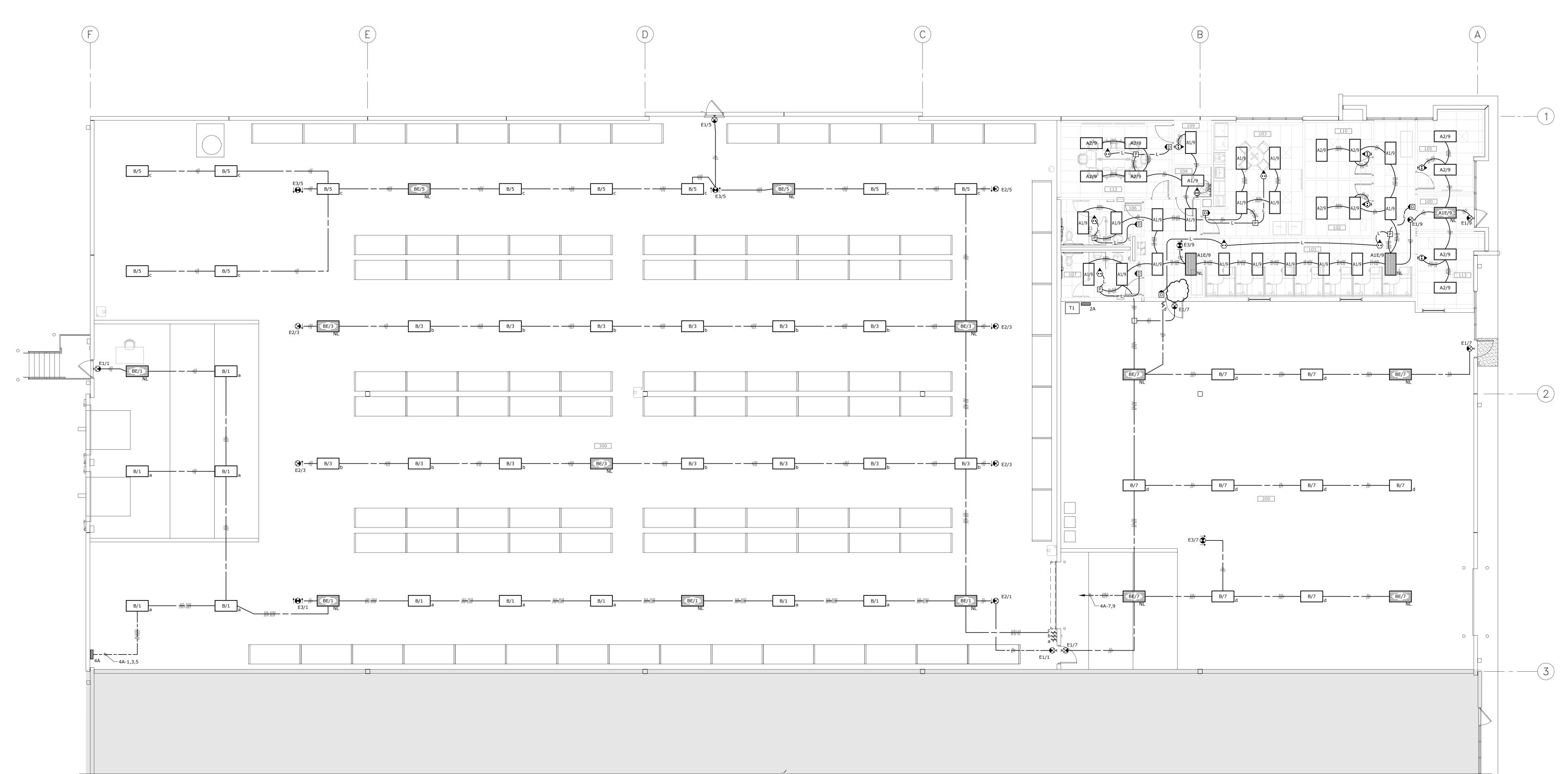






- NOTES:

 1. BRANCH CIRCUIT CONDUCTOR SIZES SHALL MINIMALLY BE #12 AWG. WHERE THE LENGTH OF A HOMERUN, FROM PANEL TO FIRST DEVICE, EXCEEDS 75 FEET FOR A 120 VOLT CIRCUIT OR 175 FEET FOR A 277 VOLT CIRCUIT, THE MINIMUM CONDUCTOR SIZE SHALL BE #10 AWG.
- 2. DEVICES INSTALLED IN FIRE RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH IBC ARTICLE 714.4.2. COORDINATE WALL TYPES WITH THE ARCHITECTURAL DRAWINGS.
- PLAN SHADING IDENTIFIES EXISTING LIGHTING, RECEPTACLES, EQUIPMENT WIRING, AND SYSTEMS WIRING TO REMAIN AND BE MAINTAINED UNLESS NOTED OTHERWISE (TYP).



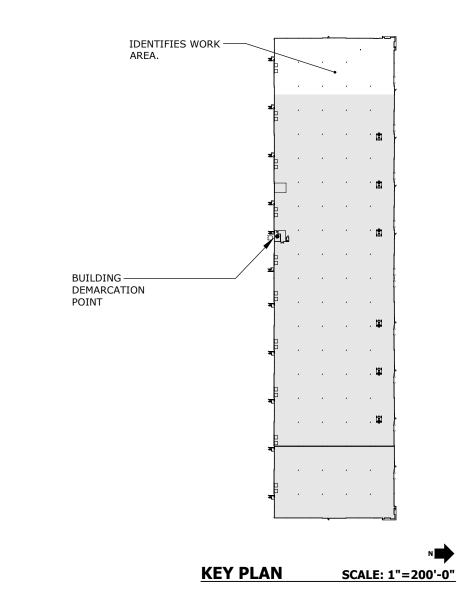
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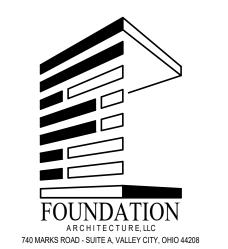
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PLAN



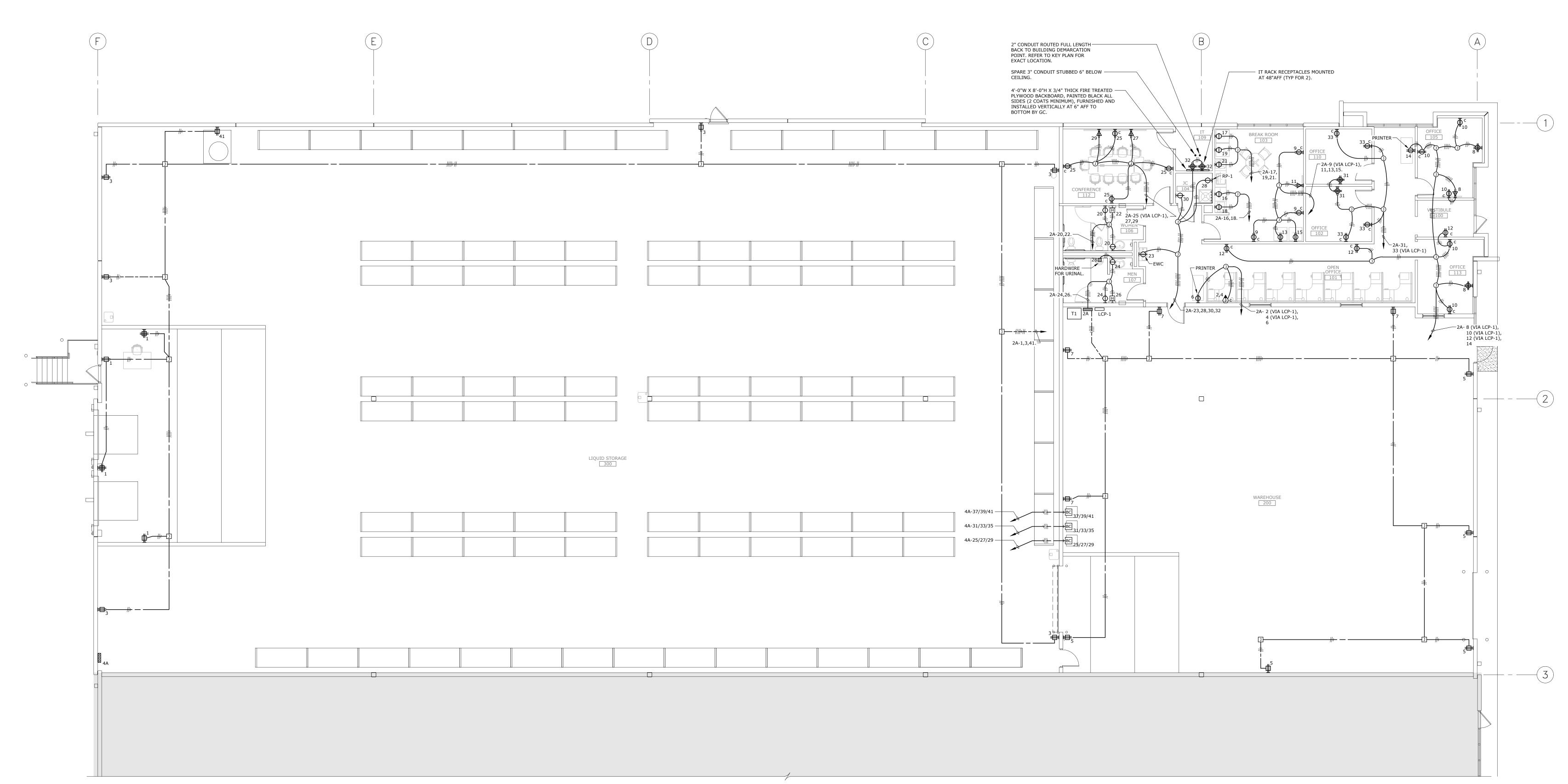






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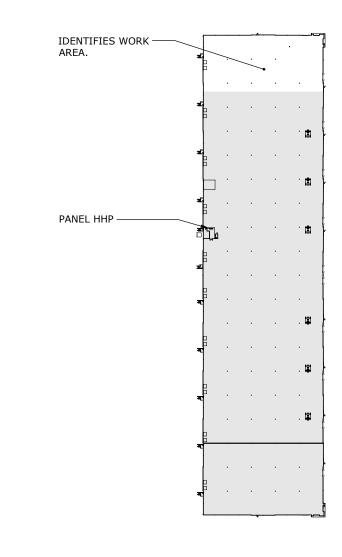


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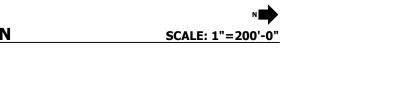
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DRAWING TITLE: RECEPTACLE PLAN







- NOTES:

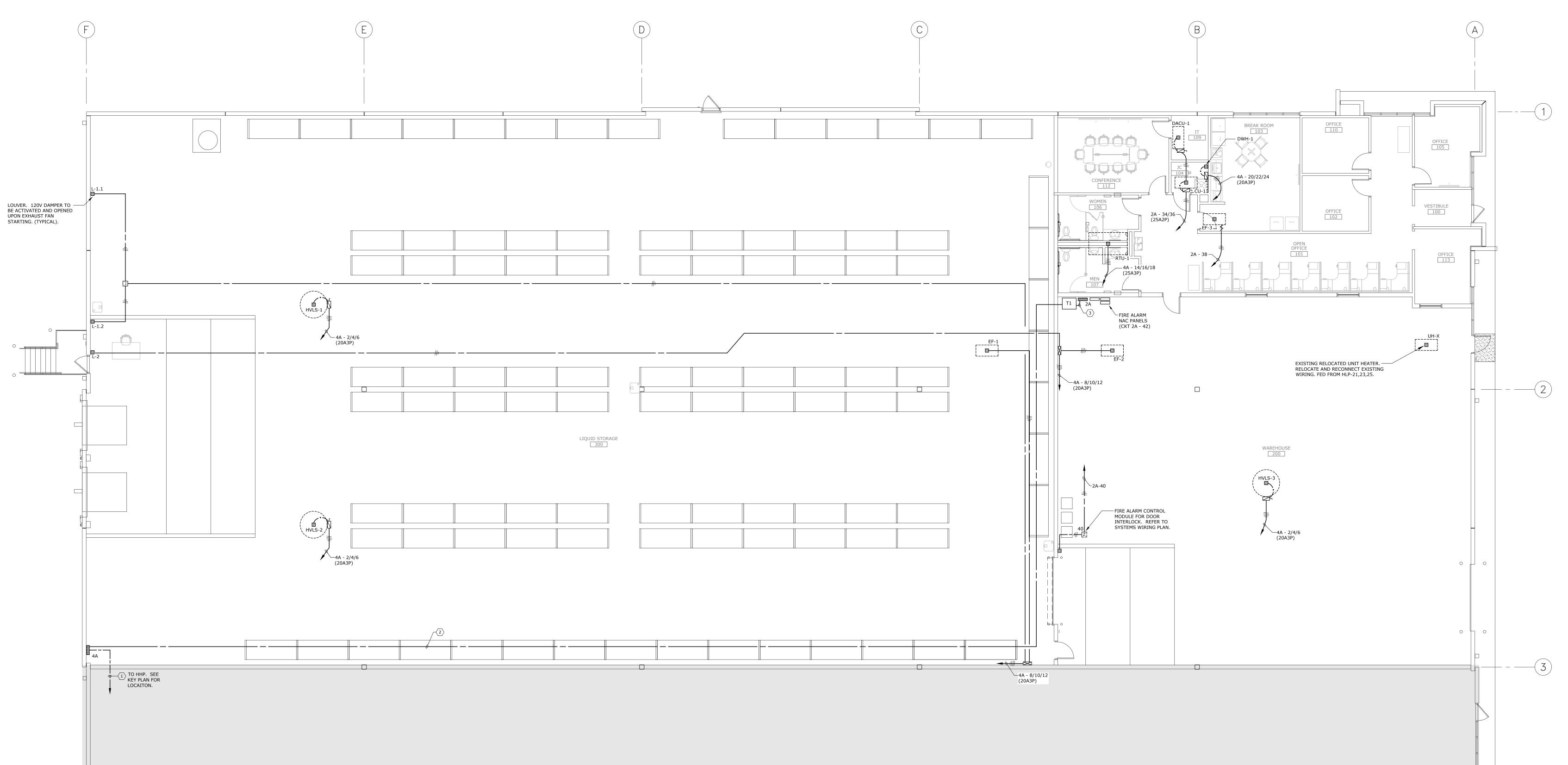
 1. BRANCH CIRCUIT CONDUCTOR SIZES SHALL MINIMALLY BE #12 AWG. WHERE THE LENGTH OF A HOMERUN, FROM PANEL TO FIRST DEVICE, EXCEEDS 75 FEET FOR A 120 VOLT CIRCUIT OR 175 FEET FOR A 277 VOLT CIRCUIT, THE MINIMUM CONDUCTOR SIZE SHALL BE #10 AWG.
- DEVICES INSTALLED IN FIRE RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH IBC ARTICLE 714.4.2. COORDINATE WALL TYPES WITH THE ARCHITECTURAL DRAWINGS.
- 3. PLAN SHADING IDENTIFIES EXISTING LIGHTING, RECEPTACLES, EQUIPMENT WIRING, AND SYSTEMS WIRING TO REMAIN AND BE MAINTAINED UNLESS NOTED OTHERWISE (TYP).
- 4. " $\langle xx \rangle$ " IDENTIFIES FEEDER. REFER TO DISTRIBUTION DIAGRAM.



740 MARKS ROAD - SUITE A, VALLEY CITY, OHIO 44208

RELEASED FOR

JONATHAN J. **JENNINGS** NUMBER ∅**%** PE-2023000149 **/**₩̄ξ



MECHANICAL EQUIPMENT SCHEDULE

DISCONNECT BY EC, FEEDS DACU-1

DISCONNECT BY EC, FED FROM CU-1 DISCONNECT BY MFR, STARTER BY EC

DISCONNECT BY MFR, STARTER BY EC

DISCONNECT BY MFR, STARTER BY EC

DISCONNECT BY MFR

DISCONNECT BY EC

DISCONNECT BY EC

DISCONNECT BY EC

DISCONNECT BY EC

208V, 1Ø, 11 MCA, 28A MOCP

208V, 1Ø, 0.2 FLA

480V, 3Ø, 5 HP

480V, 3Ø, 2 HP

120V, 1Ø, 1/6 HP

480V, 3Ø, 20 MCA, 25A MOCP

120V, 1Ø, 2 FLA

120V, 1Ø, 2 FLA

120V, 1Ø, 2 FLA

480V, 3Ø, 2.5 FLA

480V, 3Ø, 2.5 FLA

480V, 3Ø, 2.5 FLA

480V, 3Ø, 7.2 FLA

DESCRIPTION

CONDENSING UNIT

EXHAUST FAN

EXHAUST FAN

EXHAUST FAN

ROOF TOP UNIT

LOUVER

LOUVER

LOUVER

HVLS FAN

HVLS FAN

HVLS FAN

ELECTRIC WATER HEATER

DACU-1 DUCTLESS AIR CONDITIONING UNIT

CU-1

EF-3

RTU-1

L-1.1

HVLS-1 HVLS-2

DWH-1

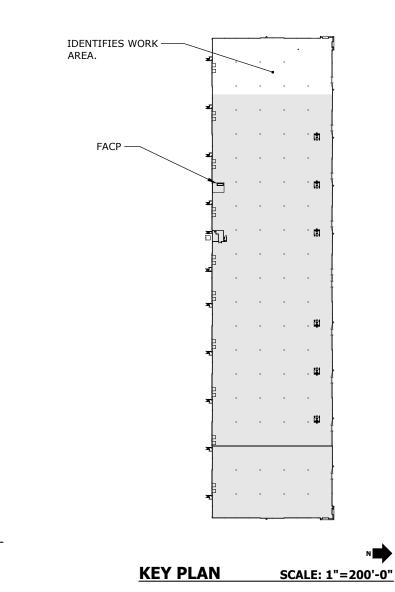
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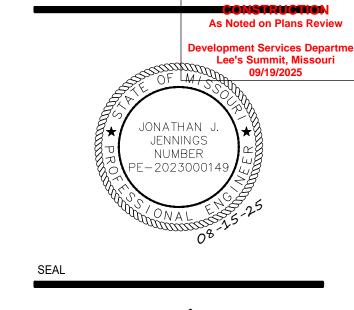
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DRAWING TITLE: **EQUIPMENT WIRING** PLAN

EQUIPMENT WIRING PLAN





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DRAWING TITLE: SYSTEMS WIRING

1. REFER TO SYMBOLS AND SPECIFICATIONS FOR EQUIPMENT DESCRIPTION.

PRIOR TO INSTALLATION.

 EC SHALL VERIFY EXISTING FIRE ALARM SYSTEM IN FIELD. VERIFY DEVICE PART NUMBERS AND CABLE TYPE WITH FIRE ALARM MANUFACTURER PRIOR TO ORDERING. 3. DEVICES INSTALLED IN FIRE RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH IBC ARTICLE 714.4.2. COORDINATE WALL TYPES

WITH THE ARCHITECTURAL DRAWINGS. 4. FIRE ALARM SYSTEM PLAN IS A DEFERRED SUBMITTAL. FIRE ALARM VENDOR SHALL HAVE SUBMITTAL DRAWINGS THAT INCLUDE LOAD CALCS AND POINT TO POINT CABLING APPROVED BY BUILDING DEPARTMENT

5. REFER TO DRAWING E2.01 FOR ELECTRICAL FIXTURE & SYMBOLS SCHEDULES.

6. UNLESS NOTED OTHERWISE, PLAN SHADING THIS DRAWING IDENTIFIES AREAS IN WHICH SUSPENDED GRID CEILINGS, LIGHT FIXTURES, WALLS, WALL MOUNTED DEVICES, AND CARPETING/TILING SHALL REMAIN AND BE MAINTAINED.

7. ELECTRICAL CLASSIFICATION AND FIRE CODE REQUIREMENTS FOR THE WAREHOUSE/STORAGE AREAS ARE BASED ON THE "FIRE PROTECTION AND LIFE SAFETY ANALYSIS REPORT" PROVIDED BY ARCHITECT/OWNER'S FIRE PROTECTION PROFESSIONAL ENGINEERING CONSULTANT.

FIRE ALARM EXTENDER PANEL TO SERVE WAREHOUSE AND OFFICE NOTIFICATION DEVICES. REFER TO SPECIFICATIONS FOR DETAILS. PROVIDE LABEL TO IDENTIFY AS "WAREHOUSE / OFFICE FIRE ALARM PANEL".

EXISTING RISER ROOM EXISTING WAREHOUSE WAREHOUSE/OFFICE

 $F \rightarrow D$

FIRE ALARM RISER DIAGRAM NO SCALE

FIRE ALARM EXTENDER PANEL TO SERVE
WAREHOUSE HAZARDOUS SPILL NOTIFICATION
DEVICES. REFER TO SPECIFICATIONS FOR DETAILS.
PROVIDE LABEL TO IDENTIFY AS "WAREHOUSE

WAREHOUSE HAZARD

SIGNAL CIRCUIT ID (TYP.)

—TO ADDITIONAL DEVICES

TO ADDITIONAL DEVICES AS SHOWN ON PLAN.

HAZARDOUS SPILL ALARM PANEL".

— FIRE ALARM CONTROL MODULE FOR FAN DROP OUT. MODULE SHALL DROP FAN POWER UPON ACTIVATION OF FIRE ALARM. - FIRE ALARM CONTROL MODULE FOR DOOR INTERLOCK. MODULE
SHALL ACTIVATE UPON
ACTIVATION OF SMOKE DETECTOR
ON EITHER SIDE OF DOOR.

SURFACE MOUNTED HIGHBAY LED FIXTURE WITH PLUG IN RECEPTACLE TO f J BE REMOVED. REMOVE ALONG WITH ASSOCIATED WIRING AND CONDUIT. EMERGENCY EGRESS LIGHTING. REMOVE ALONG WITH ALL ASSOCIATED

WIRING AND CONDUIT. 24" X 48" RECESSED CEILING MOUNTED FIXTURE. REFER TO FIXTURE SCHEDULE FOR DESCRIPTION.

24" X 48" 277V RECESSED CEILING MOUNTED FIXTURE WITH INTEGRAL EMERGENCY EGRESS BALLAST. "NL" SUBSCRIPT, WHERE SHOWN, INDICATES FIXTURE TO BE UNSWITCHED FOR 24-HOUR USE AS A NIGHT

LIGHT. REFER TO FIXTURE SCHEDULE FOR DESCRIPTION.

- CEILING MOUNTED EXIT SIGN. ARROWS, WHERE SHOWN, IDENTIFY DIRECTION OF EGRESS WHERE INDICATED ON PLANS. REFER TO FIXTURE SCHEDULE FOR DESCRIPTION.
- FLUSH WALL OR EDGE WALL MOUNTED EXIT SIGN. ARROWS, WHERE SHOWN, IDENTIFY DIRECTION OF EGRESS WHERE INDICATED ON PLANS. REFER TO FIXTURE SCHEDULE FOR DESCRIPTION.
- \$ 20 AMP, 120V, SINGLE POLE TOGGLE SWITCH BY EC. MOUNT FLUSH IN WALL AT 48" AFF. INSTALL LAMINATED LABEL (CLEAR WITH BLACK LETTERS) ON COVERPLATE TO IDENTIFY BRANCH PANEL AND CIRCUIT NUMBER. HUBBELL # HBL1221.
- 16 AMP POWER/RELAY PACK WITH 0-10V DIMMING FOR CONTROL OF LIGHTING ZONE(S), AND NETWORKING CAPABILITIES. SUBSCRIPT ADJACENT INDICATES ASSOCIATED ZONE(S) TO BE CONTROLLED. MOUNT TO JBOX ABOVE ACCESSIBLE CEILING. INSTALL LAMINATED LABEL (CLEAR WITH BLACK LETTERS) IDENTIFYING BRANCH PANEL, CIRCUIT NUMBER, AND THE FIXTURES CONTROLLED BY EACH RELAY. NLIGHT #NPP16-D OR APPROVED EQUAL.
- LOW-VOLTAGE, SINGLE-CHANNEL, 3-BUTTON ON/OFF AND RAISE/LOWER DIMMING WALL STATION WITH WHITE FINISH. FLUSH MOUNT IN A RECESSED SINGLE GANG OUTLET BOX AT 48" AFF. STUB A 1"C FROM BOX TO CEILING PLENUM FOR CABLE INSTALLATION. NLIGHT #NPODM-DX OR APPROVED EQUAL. SUBSCRIPT "2", WHERE SHOWN, INDICATES 2-CHANNEL.
- LOW-VOLTAGE CEILING MOUNTED DUAL TECHNOLOGY "PIR/MICROPHONICS" OCCUPANCY SENSOR WITH EXTENDED RANGE (2000 SQ-FT), 360-DEGREE SENSOR, NETWORKING PORT, AND WHITE FINISH. MOUNT OVER FLUSH OCTAGONAL OUTLET BOX IN CEILING. ADJUST TIME DELAY TO 30 MINUTES, AND SET SENSOR TO MANUAL-ON MODE (VACANCY SENSING). NLIGHT #NCM-PDT-10 OR APPROVED EQUAL. WHERE NOTED, SUBSCRIPTS IDENTIFY SWITCH ZONES.
- 0-10V WHITE DUAL TECHNOLOGY (PIR/ULTRASONIC) OCCUPANCY SENSOR DIMMING WALL SWITCH WITH WHITE COVERPLATE. MOUNT FLUSH IN WALL AT 48" AFF. SET TIME DELAY TO 30 MINUTES. SET SENSOR TO MANUAL-ON MODE (VACANCY SENSING). SENSOR SWITCH #WSX-PDT-D SERIES OR APPROVED EQUAL.
- 20 AMP, 120V, WHITE COLORED, SPECIFICATION GRADE SNAP CONNECT DUPLEX GROUNDING RECEPTACLE WITH #12 AWG STRANDED PLUGTAIL CONNECTOR AND WHITE COVERPLATE. (HUBBELL # SNAP5362/SNAP6R2). MOUNT FLUSH IN WALL AT 18" AFF, UNLESS NOTED OTHERWISE. INSTALL SELF LAMINATING LABEL (CLEAR W/ BLACK LETTERS) ON COVERPLATE TO IDENTIFY BRANCH PANEL AND CIRCUIT NUMBER. WHERE SHOWN, "c" INDICATES CONTROLLED RECEPTACLE WITH PERMANENTLY MARKED FACE (HUBBELL #BR202C2).
- \oplus SIMILAR TO " \oplus " EXCEPT QUAD RECEPTACLE.
- SIMILAR TO " Ψ " EXCEPT INSTALLED SURFACE MOUNTED IN CONJUNCTION WITH EXPOSED CONDUIT.
- # SIMILAR TO " # " EXCEPT QUAD RECEPTACLE.
- SIMILAR TO " Ψ " EXCEPT MOUNTED AT APPROXIMATELY 72" AFF. COORDINATE EXACT LOCATION WITH TV/WALL BRACKET.
- 20 AMP, 120V, WHITE COLORED, DUPLEX RECEPTACLE WITH INTEGRAL GFCI AND WHITE COVERPLATE. (HUBBELL # GFRST20). MOUNT FLUSH IN WALL AT 18" AFF, UNLESS NOTED OTHERWISE. INSTALL SELF LAMINATING LABEL (CLEAR W/ BLACK LETTERS) ON COVERPLATE TO IDENTIFY BRANCH PANEL AND CIRCUIT NUMBER.
- SIMILAR TO " Φ " EXCEPT MOUNTED ABOVE COUNTER OR AT 44" AFF WHERE NO COUNTER IS INSTALLED. COORDINATE EXACT HEIGHT WITH
- WALL END PANEL FURNITURE FEED ASSEMBLY CONSISTING OF A VERTICAL DROP CONCEALED IN STUD WALL, A SINGLE GANG JUNCTION BOX MOUNTED FLUSH IN WALL AT 18" AFF WITH PLASTER RING, AND A BLANK STEEL COVERPLATE WITH 1/2" FLEXIBLE METALLIC MODULAR FURNITURE WHIP BY FURNITURE VENDOR TO FURNITURE MOUNTED RECEPTACLES.
- TOW MOTOR BATTERY CHARGING UNIT FURNISHED BY OWNER. E.C. SHALL INSTALL 8'-0" LONG #10 AWG / 4C STO FLEXIBLE CORD AND NEMA L830 PLUG (480V, 3 WIRE WITH GROUND). INSTALL LAMINATED LABEL (CLEAR W/ BLACK LETTERS) ON COVERPLATE TO IDENTIFY BRANCH PANEL AND CIRCUIT NUMBER.
- JUNCTION BOX WITH BLANK SCREW COVER CONCEALED ABOVE ACCESSIBLE CEILING. SIZE AS REQUIRED BY NEC.
- JUNCTION BOX INSTALLED IN CONJUNCTION WITH EXPOSED CONDUIT. MOUNT SECURELY. SIZE AS REQUIRED BY NEC.
- 120V, 1500W ELECTRIC HAND DRYER FURNISHED BY GENERAL TRADES, SET OVER A RECESSED WALL MOUNTED OUTLET BOX AND WIRED BY EC. REFER TO ARCHITECTURAL ELEVATIONS FOR EXACT LOCATION.
- SURFACE MOUNTED 208/120V PANEL. REFER TO DISTRIBUTION DIAGRAM AND PANELBOARD SCHEDULE FOR DESCRIPTION.
- SURFACE MOUNTED 480/277V PANEL. REFER TO DISTRIBUTION DIAGRAM AND PANELBOARD SCHEDULE FOR DESCRIPTION.
- ▼ 2-PORT VOICE/DATA OUTLET WITH TWO CATEGORY JACK (TWO DATA). INSTALL IN A TWO-GANG OUTLET BOX WITH SINGLE GANG PLASTER RING SURFACE MOUNT WALL AT HEIGHT INDICATED ON ARCHITECTURAL DRAWINGS WITH 3/4" CONDUIT (WITH INSULATING BUSHING EACH END) FROM BOX TO ACCESSIBLE CEILING PLENUM.

- ▼ SIMILAR TO " ▼ " EXCEPT AT 72" AFF BEHIND MONITOR DISPLAY.
- CEILING MOUNTED WIRELESS ACCESS POINT. DEVICES SHALL BE FURNISHED BY OWNER AND INSTALLED BY LOW VOLTAGE CONTRACTOR.
- FIRE ALARM SYSTEM AUDIO/VISUAL NOTIFICATION DEVICE. REFER TO SPECIFICATIONS FOR DESCRIPTION. SURFACE MOUNT OVER 4" X 1-1/2" DEEP TWO-GANG BOX ON WALL AT 80" AFF TO BOTTOM.
- CEILING MOUNTED FIRE ALARM SYSTEM SPEAKER/STROBE NOTIFICATION DEVICE. MOUNT OVER FLUSH OCTAGON BOX TIGHT TO LAY-IN TEE BAR GRID CEILING. SUBSCRIPT INDICATES SIGNAL CIRCUIT. REFER TO SPECIFICATIONS FOR DESCRIPTION.
- FIRE ALARM SYSTEM VISUAL ONLY NOTIFICATION DEVICE. REFER TO SPECIFICATIONS FOR DESCRIPTION. SURFACE MOUNT OVER 4" X 1-1/2"

DEEP TWO-GANG BOX ON WALL AT 80" AFF TO BOTTOM.

- FIRE ALARM SYSTEM HAZARDOUS SPILL PUSH STATION AND ADDRESSABLE MONITOR MODULE. REFER TO SPECIFICATIONS FOR DESCRIPTION. ELECTRICAL CONTRACTOR SHALL MOUNT MONITOR MODULE IN BACKBOX AND INTERCONNECT WITH (2) #14 THWN CONDUCTORS. PROVIDE SELF-LAMINATING LABEL ON MODULE INDICATING DEVICE ADDRESS. SURFACE MOUNT OVER 4" X 1-1/2" DEEP TWO-GANG BOX ON WALL AT 80"
- EMERGENCY HAZARDOUS MATERIAL SPILL AUDIO/VISUAL NOTIFICATION DEVICE. REFER TO SPECIFICATIONS FOR DESCRIPTION. SURFACE MOUNT OVER 4" X 1-1/2" DEEP TWO-GANG BOX ON WALL AT 80" AFF TO BOTTOM.
- FIRE ALARM SYSTEM ADDRESSABLE CONTROL MODULE. REFER TO SPECIFICATIONS FOR DESCRIPTION.
- FIRE ALARM SYSTEM SMOKE DETECTOR. REFER TO SPECIFICATIONS FOR DESCRIPTION. MOUNT TIGHT TO UNDERSIDE OF FINISHED CEILING OVER RECESSED 4" OCTAGONAL BOX. PROVIDE SELF LAMINATING LABEL TO IDENTIFY DEVICE ADDRESS.
- CONDUIT INSTALLED CONCEALED ABOVE CEILINGS AND IN WALLS BY THE EC. HASH MARKS INDICATE QUANTITY OF # 12 AWG CONDUCTORS UNLESS OTHERWISE NOTED ON PLANS. SHORT HASH MARK INDICATES GREEN INSULATED EQUIPMENT GROUND CONDUCTOR THAT IS SIZED IN ACCORDANCE WITH NEC TABLE 250-122.
- —# CONDUIT INSTALLED EXPOSED AT ROOF STRUCTURE AND ON WALLS.
- HEAVY DUTY FUSED DISCONNECT FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR. NEMA TYPE 1 INDOORS, NEMA TYPE 3R OUTDOORS AND IN WET LOCATIONS. AMPERAGE AND NUMBER OF POLES AS INDICATED ON THE DRAWINGS. ALL SWITCHES TO CONTAIN GROUND LUG. FURNISH AND INSTALL ENGRAVED NAMEPLATE ON FRONT TRIM TO IDENTIFY LOAD SERVED.
- COMBINATION MAGNETIC MOTOR STARTER / FUSED DISCONNECT SWITCH WITH AUXILIARY SPDT CONTACT, (3) DUAL ELEMENT CURRENT LIMITING FUSES, FVNR STARTER WITH (2) NO/NC CONVERTIBLE AUXILIARY CONTACTS, 120V CONTROL POWER TRANSFORMER (WITH FUSED PRIMARY AND GROUNDED SECONDARY), HAND-OFF-AUTO SELECTOR SWITCH, RED PUSH-TO-TEST MOTOR RUN INDICATING LAMP, AND NEMA 1 SURFACE ENCLOSURE. STARTER AND FUSE SIZE AS INDICATED ON DRAWINGS. THE EC SHALL SIZE OVERLOAD ELEMENTS PER THE MOTOR NAMEPLATE FULL LOAD AMPERAGE AS COORDINATED WITH MECHANICAL SHOP DRAWINGS. ALLEN BRADLEY BULLETIN 512. INSTALL ENGRAVED NAMEPLATE ON FRONT TRIM TO IDENTIFY
- TERMINAL CONNECTION ON EQUIPMENT FURNISHED AND SET BY OTHERS. LINE CONNECTIONS BY THE ELECTRICAL CONTRACTOR.

CA	TON: WA	REHOL			T.	1	REMA	RK: 225A	3P MAI		KER (TC	PP)
			LOAD			SE				LOAD		d me
CKT	BKR	LTG (VA)	REC (VA)	MISC (VA)	DESCRIPTION	PHASE	CKT	BKR	LTG (VA)	REC (VA)	MISC (VA)	DESCRIPTION
1	20A1P		1080		RECIVING - RECEPT	Α	2	20A1P		1440		OPEN OFFICE - RECEPT
3	20A1P		1080		LIQUID STORAGE - RECEPT	В	4	20A1P		1080		OPEN OFFICE - RECEPT
5	20A1P		900		WAREHOUSE - RECEPT	С	6	20A1P			1000	PRINTER
7	20A1P		720		WAREHOUSE - RECEPT	Α	8	20A1P		900		OFFICE 105 & OFFICE 113 - RECEPT
9	20A1P		540		BREAKROOM - RECEPT	В	10	20A1P		900		OFFICE 105 - RECEPT
11	20A1P		180		BREAKROOM TV	С	12	20A1P		720		OPEN OFFICE & VESTIBULE - RECEP
13	20A1P			1200	VENDING MACHINE #1	Α	14	20A1P			1000	PRINTER
15	20A1P			1200	VENDING MACHINE #2	В	16	20A1P		180		KITCHEN - RECEPT
17	20A1P			800	ICE MACHINE	С	18	20A1P			1440	MICROWAVE
19	20A1P			800	FRIDGE	Α	20	20A1P		360		WOMEN - RECEPT
21	20A1P			1200	COFFEE MACHINE	В	22	20A1P		1200		WOMEN - HEATER
23	20A1P			1000	WATER FOUNTAIN	С	24	20A1P	***************************************	360		MEN - RECEPT
25	20A1P		720		CONFERENCE - RECEPT	Α	26	20A1P		1200		MEN - HEATER
27	20A1P		180		CONFERENCE TV #1	В	28	20A1P		180	(JC - RECEPT
29	20A1P		180		CONFERENCE TV #2	С	30	20A1P			180	RP-1
31	20A1P		720		OFFICE 102 & OFFICE 110 - RECEPT	Α	32	20A1P			1200	IT CABINET
33	20A1P		720		OFFICE 102 & OFFICE 110 - RECEPT	В	34	25A2P			1040	CU 4
35	20A1P		180		LIQUID STORAGE - RECEPT	С	36		ZOAZP			1840
37	20A1P				SPARE	Α	38	20A1P			530	EF-3
39	20A1P	***************************************		***************************************	SPARE	В	40	§20A1P			100	DOOR INTERLOCK CONTROL MODUL
41	20A1P				SPARE	С	42	§20A1P			500	FA NAC PANELS
43	20A1P				SPARE	Α	44	20A1P				SPARE
45	20A1P				SPARE	В	46	20A1P				SPARE
47	20A1P	***************************************			SPARE	С	48	20A1P	***************************************			SPARE
49	20A1P	***************************************			SPARE	Α	50	20A1P	00			SPARE
51	20A1P	***************************************			SPARE	В	52	20A1P	***************************************	<u> </u>		SPARE
53	20A1P	***************************************			SPARE	С	54	20A1P				SPARE
b-T	otal	0	7200	6200		-		·	0	7320	7790	
UC	ATING: 10 ITING: SU	JRFACE		IO DEL#	CE TO KEEP BREAKER IN THE "ON" PC						Total Lo 28510 79.23	

CAT	10N: WA	REHOU			,		REMA	RK: 400/	A3P MAI		KER (TC	OP)				
		LOAD							LOAD							
KT	BKR	LTG (VA)	REC (VA)	MISC (VA)	DESCRIPTION	PHASE	СКТ	BKR	LTG (VA)	REC (VA)	MISC (VA)	DESCRIPTION				
1	20A1P	3170			WAREHOUSE LIGHTING - EAST	Α	2				0.000					
3	20A1P	3170			WAREHOUSE LIGHTING - CENTER	В	4	20A3P			6300	HVLS-1, HVLS-2, & HVLS-3 FANS				
5	20A1P	3170			WAREHOUSE LIGHTING - WEST	С	6									
7	20A1P	2720			WAREHOUSE LIGHTING - NORTH	Α	8									
9	20A1P	1400			OFFICE LIGHTING	В	10	20A3P			9140	EF-1 & EF-2				
1	20A1P				SPARE	С	12									
3	20A1P				SPARE	Α	14									
5	20A1P				SPARE	В	16	25A3P			13300	RTU-1				
7	20A1P			<u> </u>	SPARE	С	18									
9	20A1P			<u> </u>	SPARE	Α	20		***************************************							
1	20A1P				SPARE	В	22	20A3P			10000	DWH-1				
3	20A1P		***************************************		SPARE	С	24									
5			***************************************			Α	26	20A1P	***************************************			SPARE				
7	30A3P	16	16650	BATTERY CHARGER #1	В	28	20A1P				SPARE					
9						С	30	20A1P				SPARE				
1						Α	32	20A1P	***************************************			SPARE				
3	30A3P			16650	16650	16650	16650	16650	BATTERY CHARGER #2	В	34	20A1P	***************************************			SPARE
5					AMAZONA	С	36	20A1P				SPARE				
7				1		Α	38									
9	30A3P			16650	BATTERY CHARGER #3	В	40	150A3P			28510	PANEL 2A				
1						С	42									
b-To	tal	13630	0	49950		1			0	0	67250					
	'			•	•					•	Total Lo	pad:				
R/A	TING: 14	K									130830) VA				
NUC	TING: SU	JRFACE									157.55	AMPS				

LIGHTING FIXTURE SCHEDULE:

TYPE A1: 24" X 48" X 2"D LED FLAT PANEL FIXTURE WITH 4800 LUMEN OUTPUT, 37W, 4000K COLOR TEMPERATURE, 80CRI, 120-277V UNV DRIVER, 0-10V DIMMING AND SATIN WHITE LENS. METALUX #24GR SERIES OR APPROVED EQUAL.

TYPE A1E: SIMILAR TO TYPE A1 EXCEPT WITH EMERGENCY BATTERY BACKUP. TYPE A2: SIMILAR TO TYPE A1 EXCEPT 5600 LUMEN OUTPUT AND 45W.

TYPE B: 21" X 24" X 3"D LED HIGH BAY FIXTURE WITH 30000 LUMEN OUTPUT, 226W, 4000K COLOR TEMPERATURE, 80 CRI, 120-277V UNV DRIVER, 0-10V DIMMING, INTEGRAL OCCUPANCY SENSOR, MEDIUM DISTRIBUTION, AND A FROSTED LENS. SUSPENDED FROM CEILING BELOW STRUCTURAL CEILING JOISTS AT APPROX. 30'-0" AFF. METALUX #OHB SERIES OR APPROVED

TYPE BE: SIMILAR TO TYPE B EXCEPT WITH EMERGENCY BATTERY BACKUP.

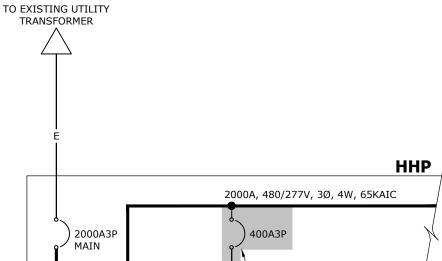
TYPE E1: WALL MOUNTED SINGLE FACED EXIT SIGN WITH 277V INPUT, GREEN LETTERING, NICKEL CADMIUM BATTERY, SELF DIAGNOSTICS, AND WHITE HOUSING. LITHONIA #LQM SERIES OR APPROVED EQUAL.

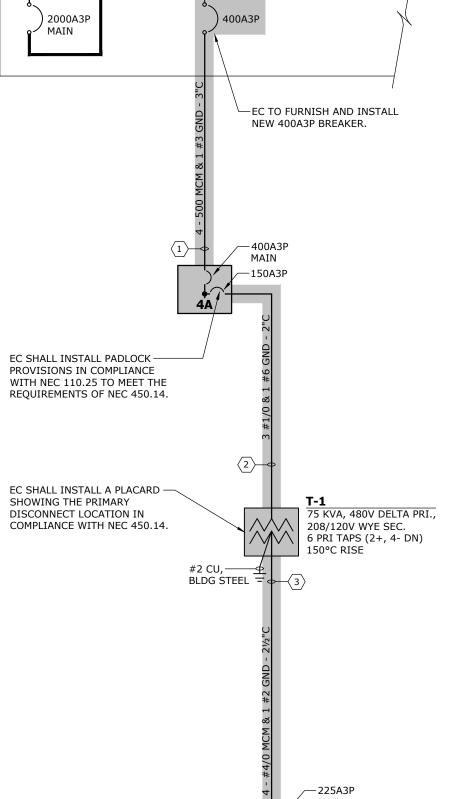
TYPE E2: SINGLE FACED EXIT SIGN MOUNTED ON CEILING OR SUSPENDED FROM CEILING AT 15'-0" AFF ON THREADED ROD IN STORAGE AREA. ARROWS, WHERE SHOWN, IDENTIFY DIRECTION OF EGRESS WHERE INDICATED ON PLANS. LITHONIA #LOM SERIES OR APPROVED EQUAL.

TYPE E3: SIMILAR TO TYPE E2 EXCEPT DUAL FACED

SCOPE ITEMS.

- 1. " $\langle XX \rangle$ " IDENTIFIES FEEDER LOCATED ON FEEDER & EQUIPMENT
- 2. EQUIPMENT, DEVICES, AND CABLING SHOWN SOLID SHALL
- REMAIN AND BE MAINTAINED. 3. EQUIPMENT, DEVICES, AND CABLING SHOWN SHADED IDENTIFY





DISTRIBUTION DIAGRAM NO SCALE

RELEASED FOR As Noted on Plans Review JONATHAN J. **JENNINGS** NUMBER PE-2023000149

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ELECTRICAL

SCHEDULES

- GENERAL PROVISIONS A. THIS CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, SUPPLIES, SERVICES, AND SHALL PERFORM ALL OPERATIONS INCLUDING SETTING OF SLEEVES, CUTTING, CHANNELING, AND CHASING NECESSARY FOR THE COMPLETE INSTALLATION OF THE ELECTRICAL WORK ON THIS PROJECT, COMPLETE IN STRICT ACCORDANCE WITH THIS SPECIFICATION AND APPLICABLE DRAWINGS, AND READY FOR USE. THIS WORK INCLUDES ALL ELECTRICAL WORK FROM THE POINT OF
- (1) THE ELECTRICAL CONTRACTOR SHALL FURNISH, INSTALL, AND REMOVE TEMPORARY LIGHTING AND POWER SERVICES AS REQUIRED FOR THE COMPLETION

SERVICE CONNECTION OR CONNECTIONS TO AND INCLUDING OUTLETS, WIRING DEVICES, LIGHTING FIXTURES, MOTOR TERMINALS, ETC.

- B. THIS CONTRACTOR IS INSTRUCTED TO READ CAREFULLY THE SPECIFICATIONS FOR ALL PARTS OF THE WORK, ESPECIALLY THE MECHANICAL TRADES OF THIS CONTRACT AND INCLUDE COSTS FOR WIRING ALL THEIR EQUIPMENT UNLESS SPECIFICALLY EXCEPTED HEREIN.
- C. ALL ITEMS OF LABOR, MATERIAL AND FOLIPMENT NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON PLANS, BUT INCIDENTAL TO, OR REQUIRED FOR THE COMPLETE INSTALLATION AND PROPER OPERATION OF THE WORK, SHALL BE FURNISHED AS IF CALLED FOR IN DETAIL BY THE SPECIFICATIONS OR DRAWINGS . PERMITS, CODES, INSPECTIONS, AND TESTS
- A. THE ELECTRICAL CONTRACTOR (EC) SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR THE PROSECUTION OF ELECTRICAL WORK. ALL PERMITS AND CERTIFICATES OF INSPECTION AND APPROVAL SIGNED BY THE CONTROLLING BUILDING DEPARTMENT SHALL BECOME PROPERTY OF THE OWNER. B. ALL WIRING SHALL BE IN COMPLIANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRIC CODE, APPLICABLE STATE AND CITY REGULATIONS, AND OSHA. IN CASES OF CONFLICT BETWEEN CODE AND SPECIFICATIONS, THE MORE RESTRICTIVE REQUIREMENTS SHALL GOVERN.
- AGENCIES HAVING JURISDICTION. (1) ARRANGE FOR INSPECTION CERTIFICATION PRIOR TO SUBMITTING FINAL REQUEST FOR PAYMENT. PAY ALL FEES IN CONNECTION WITH SUCH INSPECTIONS. (2) IMMEDIATELY CORRECT ANY WORK FOUND AT VARIANCE WITH THESE SPECIFICATIONS, THE NATIONAL ELECTRICAL CODE, OR REQUIREMENTS OF

C. FOLLOWING COMPLETION OF THE ELECTRICAL WORK, FURNISH TO THE OWNER, IN DUPLICATE, CERTIFICATES OF INSPECTION AND APPROVAL BY REGULATORY

- GOVERNING REGULATORY AGENCIES (3) DEMONSTRATE, BY TEST, THAT ALL WORK COMPLIES WITH THE STATED STANDARDS. TESTS WILL INCLUDE: OPERATION OF LIGHTS AND EQUIPMENT, CONTINUITY OF CONDUIT SYSTEM, GROUNDING RESISTANCES AND INSULATION RESISTANCES ON NOT MORE THAN 10 REPRESENTATIVE CIRCUITS AND ANY OTHER CIRCUITS JUSTIFYING SUCH TESTING, AND ANY OTHER TESTING IDENTIFIED IN THIS SPECIFICATION. LABOR AND EQUIPMENT FOR PERFORMING FESTS SHALL BE SUPPLIED AS PART OF THE WORK UNDER THIS DIVISION.
- 3. VISIT TO THE SITE A. THE CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE WORK. THE SUBMISSION OF A PROPOSAL SHALL PRESUPPOSE KNOWLEDGE OF ALL SUCH CONDITIONS.
- . PROTECTION A. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PROTECTION FROM DIRT AND WATER DURING CONSTRUCTION NECESSITATED BY ELECTRICAL
- WORK. PROTECTION METHODS ARE SUBJECT TO APPROVAL BY THE CONSTRUCTION MANAGER AND/OR THE ARCHITECT. . EQUIPMENT AND EQUIPMENT IDENTIFICATION
- DESCRIBE, OR PLANS SHOW, MATERIALS OR EQUIPMENT OF HIGHER QUALITY THAN REQUIRED BY CODE AND LOCAL RULING, THE DRAWINGS AND SPECIFICATIONS SHALL GOVERN THE QUALITY OF THE MATERIAL OR EQUIPMENT. B. THE CONTRACTOR SHALL SUBMIT PROOF. IF REQUESTED BY THE OWNER, THAT THE MATERIALS, APPLIANCES, EQUIPMENT OR DEVICES THAT ARE FURNISHED

A. ALL EQUIPMENT AND DEVICES SHALL BE NEW AND SHALL CONFORM TO NEMA AND UNDERWRITERS' LABORATORIES STANDARDS. WHERE SPECIFICATIONS

- AND INSTALLED UNDER THIS CONTRACT MEET THE REQUIREMENTS OF THE UNDERWRITERS' LABORATORIES, INC., AS REGARDING FIRE AND CASUALTY HAZARDS. THE LABEL OF OR LISTING BY THE LINDERWRITERS' LABORATORIES. INC. WILL BE ACCEPTED AS CONFORMING WITH THIS REQUIREMENT. IN LIFTLOF THE LABEL OR LISTING, THE CONTRACTOR MAY SUBMIT INDEPENDENT PROOF SATISFACTORY TO THE ENGINEER THAT THE MATERIALS, APPLIANCES OR DEVICES CONFORM TO THE UNDERWRITERS' LABORATORIES, INC. PUBLISHED STANDARDS AND TESTING METHODS. UNDERWRITERS' LABORATORIES, INC. AND ITS PUBLICATIONS WILL BE REFERRED TO HEREINAFTER BY THE ABBREVIATION UL. WITH OR WITHOUT ADDITIONAL IDENTIFYING SYMBOLS.
- C. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A SYSTEM OF NAMEPLATES DESIGNED TO IDENTIFY EACH PIECE OF ELECTRICAL EOUIPMENT INCLUDING BUT NOT LIMITED TO, SWITCHBOARDS, DISTRIBUTION PANELBOARDS, CIRCUIT BREAKERS AND FUSED SWITCHES WITHIN SWITCHBOARDS AND DISTRIBUTION PANELBOARDS, BRANCH CIRCUIT PANELBOARDS, MOTOR CONTROL CENTERS, CONTROL PANELS, TRANSFORMERS, CIRCUIT BREAKERS, DISCONNECT SWITCHES, MOTOR STARTERS, COMBINATION MOTOR STARTERS, VARIABLE FREQUENCY DRIVES, AND CONTACTORS. NAMEPLATES SHALL ALSO BE PROVIDED BY THE ELECTRICAL CONTRACTOR FOR MECHANICAL EQUIPMENT UNLESS THE EQUIPMENT IS LOCATED ADJACENT TO A NAMEPLATED LOCAL DISCONNECT AND THE EQUIPMENT DESIGNATION IS READILY APPARENT.
- (1) NAMEPLATES SHALL BE ENGRAVED MICARTA BLACK WITH WHITE LETTERS FOR NORMAL POWER SOURCE AND RED WITH WHITE LETTERS FOR EMERGENCY POWER SOURCE, UNLESS NOTED OTHERWISE ON THE DRAWINGS. NAMEPLATES SHALL BE ADHERED TO A CLEAN FLAT SURFACE OR MECHANICALLY FASTENED TO THE EQUIPMENT. SELF LAMINATING OR HAND WRITTEN LABELS ARE NOT ACCEPTABLE.
- (2) SWITCHBOARD, DISTRIBUTION PANELBOARD, BRANCH CIRCUIT PANELBOARD, AND MOTOR CONTROL CENTER NAMEPLATES SHALL IDENTIFY PANEL DESIGNATION, VOLTAGE, AND DESIGNATION OF UPSTREAM SOURCE:
- (A) LINE 1: "PANEL 1-2A"
- (B) LINE 2: "208/120V, 3Ø, 4-WIRE" (C) LINE 3: "FED FROM SWITCHBOARD SDP-2A"
- D. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL IDENTIFYING LABELS, WHERE NECESSARY OR AS DIRECTED BY THE OWNER, FOR ALL PUSHBUTTONS, SELECTOR SWITCHES, KEY SWITCHES, TOGGLE SWITCHES, MANUAL MOTOR STARTERS, RECEPTACLES, SPECIAL OUTLETS, ETC. (1) LABELS SHALL BE SELF LAMINATING WHITE WITH BLACK LETTERS, UNLESS NOTED OTHERWISE ON THE DRAWINGS, AND SHALL BE ADHERED TO A CLEAN
- A THE FLECTRICAL CONTRACTOR SHALL GUARANTEE FOR A PERIOD OF ONE YEAR (FROM THE DATE OF OWNER ACCEPTANCE) THAT ALL WORK AND FOLITIMENT WILL REMAIN FREE FROM ALL DEFECTS IN WORKMANSHIP AND MATERIALS, AND THAT IT WILL COMPLY WITH ALL THE SPECIFIC REQUIREMENTS OF THE
- SPECIFICATIONS AND OTHER CONTRACT DOCUMENTS GOVERNING THE WORK. B. ALL WORK FOUND BY THE ENGINEER TO BE DEFECTIVE WILL BE REPLACED WITH NEW WORK MEETING ALL THE REQUIREMENTS OF THE CONTRACT. THE ELECTRICAL CONTRACTOR WILL BEAR ALL COSTS OF SUPPLYING SUCH NEW WORK, AND INSTALLING AND FINISHING SAME, AND WILL ASSUME ALL COSTS FOR REPLACING OTHER WORK DAMAGED BY THE REMOVAL AND REPLACEMENT OF ANY OF THE WORK. THE ELECTRICAL CONTRACTOR WILL BEAR ALL COSTS FOR
- FREIGHT, DRAYAGE AND DEMURRAGE, AND ALL LABOR IN CONNECTION THEREWITH. . CUTTING, PATCHING, FIRESTOPPING, CLEANING, AND PAINTING
- A. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING ALL HOLES REQUIRED FOR INSTALLATION OF ELECTRICAL WORK. HOLES SHALL BE CUT IN A NEAT MANNER SATISFACTORY TO THE ENGINEER. B. THE LOCATION OF ALL CONDUIT AND BOXES SHALL BE PREDETERMINED BY THIS CONTRACTOR WHO SHALL BE RESPONSIBLE FOR THE INSTALLATION OF SAME
- C. ALL HOLES OR DAMAGE CAUSED BY THE REMOVAL OF EXISTING WORK OR THE INSTALLATION OF NEW WORK SHALL BE PROPERLY PATCHED BY THIS CONTRACTOR. HOLES SHALL BE NEATLY PATCHED WITH SUITABLE MATERIAL TO MATCH EXISTING SURFACES. HOLES THROUGH FLOORS OR FIRE WALLS SHALL BE SEALED WITH THE APPROPRIATE INTUMESCENT CAULK, PUTTY, STRIP, BLOCK, SPONGE, OR SHEET TYPE FIRE BARRIER PRODUCT; HILTI "FS-ONE", NELSON "FLAMESEAL", SPECIFIED TECHNOLOGIES INC. "SPEC SEAL", INTERNATIONAL PROTECTIVE COATINGS "FLAMESAFE", CSD SEALING SYSTEMS, OR APPROVED
- D. FIRESTOPPING MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH ALL U.L. SYSTEM REQUIREMENTS FOR THE TYPE OF PENETRATION AND FIRESTOPPIN SYSTEM USED. FIRESTOPPING MATERIALS SHALL BE HILTI INC. OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE LISTING FOR THE FURNISHED MANUFACTURER AND PENETRATING COMPONENT.
- (A) METAL PIPE THROUGH GYPSUM BOARD HILTI #W-L-1054 (B) METAL PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY - HILTI #F-C-1059
- (C) PLASTIC PIPE THROUGH GYPSUM WALL ASSEMBLY HILTI #W-L-2251 (D) PLASTIC PIPE THROUGH WOOD FLOOR/CEILING ASSEMBLY - HILTI #F-C-2127
- (E) CABLE THROUGH GYPSUM BOARD HILTI #W-L-306
- (F) CABLE/CABLE BUNDLE THROUGH WOOD FLOOR/CEILING ASSEMBLY HILTI #F-C-3012 (G) CABLE TRAY THROUGH GYPSUM BOARD - HILTI #W-L-4011, #W-L-4019
- (H) CABLE TRAY THROUGH GYPSUM WALL ASSEMBLY HILTI #W-L-4011
- (A) METAL PIPE THROUGH MASONRY/CONCRETE FLOOR OR WALL HILTI #C-AJ-1155, #C-AJ-1226
- (B) METAL PIPE THROUGH POURED CONCRETE FLOOR SLABS HILTI #F-A-1017 (C) PLASTIC PIPE THROUGH MASONRY/CONCRETE FLOOR OR WALL - HILTI #C-AJ-2109
- (D) CABLE THROUGH MASONRY/CONCRETE FLOOR OR WALLS HILTI #C-AJ-3095 (E) CABLE THROUGH POURED CONCRETE FLOOR SLABS - HILTI #F-A-3007
- (F) CABLE TRAY THROUGH MASONRY/CONCRETE FLOOR OR WALL HILTI #C-AJ-4035
- (G) MULTIPLE CABLE TRAYS THROUGH MASONRY/CONCRETE FLOOR OR WALL HILTI #C-AJ- 4017
- E. SWAB INTERIORS OF CONDUITS CLEAN AND DRY BEFORE PULLING WIRE. CLEAN INTERIORS OF BOXES AND CABINETS BEFORE INSTALLING TRIMS AND COVERS. F. ALL PAINTING REQUIRED BY ELECTRICAL DEMOLITION OR BY THE INSTALLATION OF NEW ELECTRICAL CONDUIT AND EQUIPMENT SHALL BE THE RESPONSIBILITY
- G. ALL RACEWAYS, JUNCTION BOXES, OUTLET BOXES, RACEWAY SUPPORTS, ETC. INSTALLED EXPOSED ON THE SURFACE OF EXISTING PAINTED SURFACES SHALL BE PAINTED (2 COATS MINIMUM) BY THE ELECTRICAL CONTRACTOR TO MATCH EXISTING SURFACES.
- (1) RACEWAYS INSTALLED ON UNPAINTED MASONRY SHALL NOT BE PAINTED (2) IVORY COLORED WIREMOLD RACEWAYS AND WIREMOLD OUTLET BOXES SURFACE MOUNTED ON IVORY OR WHITE PAINTED SURFACES SHALL NOT BE
- (3) SUBMIT PAINT CHIPS TO THE ARCHITECT FOR APPROVAL PRIOR TO THE PURCHASE OF ANY PAINT.
- H. ELECTRICAL CONTRACTOR SHALL PATCH AND FINISH SAND ALL EXISTING SURFACES MARRED BY THE REMOVAL OF EXISTING CONDUITS, CABLE, AND EQUIPMENT. WHERE PATCHES ARE EXPOSED ON EXISTING PAINTED SURFACES, THEY SHALL BE PAINTED (2 COATS MINIMUM) BY THE ELECTRICAL CONTRACTOR
- I. TOUCH UP AND REPAIR ANY DAMAGED FACTORY FINISHES ON EQUIPMENT AND MATERIALS FURNISHED. REMOVE ANY RUST SPOTS, PRIME WITH RUST INHIBITIVE PAINT ANY METAL SURFACES OF ELECTRICAL DEVICES NOT PROVIDED WITH RUST INHIBITIVE COATINGS, THEN APPLY PAINT (2 COATS MINIMUM) TO
- A. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC, INDICATING GENERAL ARRANGEMENT, APPROXIMATE SIZES, GENERAL LOCATIONS OF EQUIPMENT AND OUTLETS VERIFY DIMENSIONS IN FIELD; ADJUST TO MANUFACTURER'S SHOP DRAWINGS. DO NOT SCALE DRAWINGS. B. ARCHITECTURAL AND STRUCTURAL DRAWINGS SUPERSEDE ELECTRICAL DRAWINGS. DETERMINE THAT WORK OF THIS DIVISION CAN BE ACCOMMODATED
- WITHIN SPACES PROVIDED. NOTIFY ARCHITECT OF ANY INTERFERENCES BEFORE STARTING INSTALLATION. C. DETERMINE SIZES, LOCATIONS FOR CHASES, AND OPENINGS NECESSARY FOR INSTALLATION OF ELECTRICAL WORK. COOPERATE WITH OTHER TRADES IN
- D. COORDINATE THIS WORK WITH ALL TRADES. ARRANGE OPERATIONS SO AS NOT TO DELAY INSTALLATION OR COMPLETION OF ANY PARTS OF INTERRELATED
- WORK SO THAT CONSTRUCTION MAY PROCEED ON SCHEDULE. ARRANGE WORK AND SCHEDULE CONTINUOUS WORK SHIFTS TO PROVIDE MINIMUM POSSIBLE
- E. COOPERATE WITH MECHANICAL TRADES IN PREPARING INTERFERENCE DRAWINGS FOR POINTS WHERE THERE IS POSSIBLE CONFLICT BETWEEN TRADES. EXACT LOCATION OF PIPES, DUCTS, AND CONDUITS BASED ON FIELD MEASUREMENTS WITH FINAL ARRANGEMENT DETERMINED BY INTRA-TRADE AGREEMENTS ARE SUBJECT TO APPROVAL BY THE ARCHITECT
- F. DRAWINGS OTHER THAN ELECTRICAL DRAWINGS AND OTHER SECTIONS OF THIS SPECIFICATION MAY SHOW OR SPECIFY ELECTRICALLY OPERATED EQUIPMENT. WIRING DIAGRAMS, ETC. THE CONTRACTOR SHALL EXAMINE ALL SUCH DRAWINGS AND SPECIFICATION SECTIONS TO BECOME FAMILIAR WITH THE CHARACTERISTICS OF AND REQUIRED CONNECTIONS FOR ALL EQUIPMENT FOR WHICH WIRING IS TO BE PROVIDED.
- G. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER BY FIRST-CLASS MECHANICS. THE CONTRACTOR SHALL PROVIDE ADEQUATE AND
- H. CONDUITS, WIRING, AND EQUIPMENT SHALL BE ARRANGED SUBSTANTIALLY AS INDICATED. ANY CHANGE RESULTING IN A SAVINGS IN LABOR OR MATERIAL SHALL BE MADE ONLY IN ACCORDANCE WITH A CONTRACT CHANGE ORDER. DEVIATIONS SHALL BE MADE ONLY WHERE NECESSARY TO AVOID INTERFERENCES AND ONLY AFTER DRAWINGS SHOWING THE PROPOSED DEVIATIONS HAVE BEEN SUBMITTED TO AND APPROVED BY THE ARCHITECT.
- I. CONSTRUCTION MANAGER AND ARCHITECT RESERVE THE RIGHT TO MAKE REASONABLE CHANGES IN INDICATED LOCATIONS WITHOUT ADDITIONAL COST TO
- . REMOVAL AND REARRANGEMENT OF EXISTING WIRING AND ELECTRICAL EQUIPMENT A. REMOVE ALL EXISTING WIRING AND ELECTRICAL DEVICES THAT INTERFERE WITH NEW CONSTRUCTION AND ARE NOT NECESSARY TO MAINTAIN SERVICE TO
- LOADS THAT ARE TO REMAIN B. RELOCATE, AND/OR EXTEND AS REQUIRED, WIRING THAT INTERFERES WITH NEW CONSTRUCTION AND IS ESSENTIAL TO MAINTAIN SERVICE TO LOADS THAT
- C. REMOVE AND/OR RELOCATE THOSE DEVICES SPECIFICALLY INDICATED ON THE DRAWINGS
- D. IN THOSE CASES WHERE DEVICES ARE REMOVED, THE ASSOCIATED WIRING THAT WILL NO LONGER BE ACTIVE SHALL BE REMOVED FULL LENGTH BACK TO THE SOURCE OR FIRST ACTIVE JUNCTION POINT.
- E. PROVIDE NEW UPDATED TYPED CIRCUIT DIRECTORIES FOR ALL PANELS EFFECTED BY DEMOLITION WORK. F. CONDUITS TO BE ABANDONED THAT PENETRATE ON GRADE FLOOR SLABS SHALL BE CUT FLUSH WITH SLAB, FILED TO REMOVE ALL BURRS, AND GROUTED TO
- G. ELECTRICAL CONTRACTOR SHALL SAFELY DISPOSE OF ALL FLUORESCENT AND HID BALLASTS AND LAMPS IN FULL COMPLIANCE WITH ALL FEDERAL AND STATE EPA REGULATIONS. ELECTRICAL CONTRACTOR SHALL, UNDER THE BASE BID PROPOSAL, PACKAGE, AND DISPOSE OR RECYCLE ALL LAMPS AND BALLASTS
- (1) DISPOSAL SHALL BE DONE AT AN EPA APPROVED HAZARDOUS WASTE FACILITY.

MATERIALS, WEIGHT, MAINTENANCE, FEATURES, ETC. ALL LIGHTING FIXTURES SHALL BE SUBMITTED AT ONE TIME

- (2) RECYCLING SHALL BE DONE BY AN EPA APPROVED RECYCLE FACILITY. (3) ELECTRICAL CONTRACTOR SHALL PROVIDE BOTH OWNER AND ARCHITECT WITH COPIES OF ALL LAMP AND BALLAST DISPOSAL/RECYCLE DOCUMENTATION IN
- ACCORDANCE WITH U.S. EPA AND STATE EPA REGULATIONS H. ALL ELECTRICAL MATERIAL AND DEVICES THAT ARE REMOVED SHALL BE STORED ON THE SITE FOR SALVAGE BY THE OWNER. ALL ITEMS NOT SELECTED FOR SALVAGE SHALL BECOME THE PROPERTY OF THE FLECTRICAL CONTRACTOR AND SHALL BE REMOVED BY HIM FROM THE SITE.
- A. THIS CONTRACTOR SHALL PREPARE OR OBTAIN FROM THE MANUFACTURERS SHOP DRAWINGS OF THE ITEMS LISTED BELOW AND AFTER REVIEW AND STAMPING SHALL SUBMIT ELECTRONICALLY FOR REVIEW. B. ELECTRONIC SUBMITTALS SHALL BE IN PDE FORMAT. SUBMITTALS SHALL INCLUDE A TRANSMITTAL INCLUDE A CONTRACTOR REVIEW STAMP THAT INDICATES
- APPROVAL BY THE CONTRACTOR, SHALL CLEARLY INDICATE EACH ITEM TO BE REVIEWED WITH SPECIFIC NOTES IDENTIFYING ANY DEVIATION FROM THE CONTRACT DOCUMENTS, AND BE BOUND INTO A SINGLE DOCUMENT NAMED TO MATCH CONTENTS THESE DRAWINGS SHALL BE COMPLETE IN EVERY RESPECT, SHOWING PERTINENT DETAILS OF SIZE, CAPACITIES, ACCESSORIES, TYPE AND THICKNESS OF
- (2) WIRING DEVICES (3) PANELBOARDS
- (4) TRANSFORMERS
- (5) DISCONNECT SWITCHES
- (6) FLOOR BOXES (7) OCCUPANCY SENSORS & LIGHTING CONTROLS
- (8) FIRE ALARM SYSTEM

- 11. OPERATION AND MAINTENANCE MANUALS
- A. ELECTRICAL CONTRACTOR SHALL FURNISH TO THE OWNER OPERATION/MAINTENANCE MANUALS AS DESCRIBED IN THE DIVISION 1 SPECIFICATIONS. B. MANUALS SHALL MEET OR EXCEED ALL DIVISION 1 SPECIFICATION REQUIREMENTS AND SHALL MINIMALLY INCLUDE THREE (3) INDIVIDUALLY BOUND AND INDEXED (THUMB TABBED) MANUALS. EACH MANUAL SHALL PROVIDE OPERATING INSTRUCTIONS, MAINTENANCE MANUALS, SPARE PARTS LISTING, COPIES OF
- C. UNLESS OTHERWISE DIRECTED BY THE DIVISION 1 SPECIFICATION EACH MANUAL SHALL BE BOUND IN A HEAVY-DUTY, 3 INCH, THREE-RING VINYL COVERED BINDER WITH POCKET FOLDERS FOR DRAWINGS AND FOLDED SHEET INFORMATION. EACH BINDER SHALL BE IDENTIFIED ON BOTH THE FRONT AND THE SPINE.
- A. AS WORK PROGRESSES, RECORD ON A SET OF RED-LINED "AS-BUILT" PRINTS ANY DEVIATIONS FROM DESIGN DRAWINGS. DELIVER TO THE OWNER AND ENGINEER IN ELECTRONIC FORMAT AUTOCAD (DWG) OR ADOBE ACROBAT (PDF) BEFORE SUBMITTING THE REQUEST FOR FINAL PAYMENT 13. BRANCH CIRCUIT PANELBOARDS

WARRANTIES, WIRING DIAGRAMS, INSPECTION PROCEDURES AND SHOP DRAWINGS ON ALL EQUIPMENT AND SYSTEMS.

- A. BRANCH CIRCUIT PANELBOARDS SHALL BE DEAD FRONT TYPE AND SURFACE OR FLUSH MOUNTED AS SPECIFIED ON THE DRAWINGS. THE FRAMEWORK IS TO BE OF CODE GAUGE STEEL, RIGIDLY WELDED AND BOLTED TOGETHER TO SUPPORT ALL COVER PLATES, BUSSING, AND COMPONENT DEVICES DURING SHIPMENT
- (1) FRONT TRIM SHALL CONSIST OF A SCREW REMOVABLE NON-VENTILATED HINGED COVER WITH HINGED DOOR, CONCEALED DOOR HINGES, FLUSH RECTANGULAR DOOR LOCK, ADHESIVE PANELBOARD DIRECTORY SLEEVE, AND TWO (2) STANDARD MANUFACTURERS KEYS. (2) FRONT TRIM SHALL BE FLUSH WITH PANELBOARD TUB FOR SURFACE MOUNTED PANELBOARDS AND EXTEND 1/8" BEYOND PANELBOARD TUB, ON ALL SIDES, FOR FLUSH MOUNTED PANELBOARDS.
- (3) EXTERIOR AND INTERIOR METAL SURFACES OF THE PANELBOARD SHALL BE FINISHED WITH BAKED ENAMEL OVER AN IRON PHOSPHATE PRE-TREATMENT. THE ENAMEL FINISH SHALL BE LIGHT GRAY ANSI #61 OR DARK GRAY ANSI #49. B. BRANCH CIRCUIT PANELBOARDS SHALL BE ARRANGED FOR 480/277 VOLT, THREE-PHASE, FOUR-WIRE OR 208/120 VOLT, THREE-PHASE, FOUR-WIRE AS SHOWN

C. PANELBOARDS SHALL BE SEQUENCED BUSSED, I.E., CIRCUITS 1 AND 2 TO PHASE "A", 3 AND 4 TO PHASE "B", 5 AND 6 TO PHASE "C", ETC., TO CONFORM TO THE

- D. PHASE AND NEUTRAL BUSSES SHALL BE TIN OR SILVER PLATED ALUMINUM OR COPPER, OF THE CURRENT RATINGS INDICATED ON THE DRAWINGS, AND SIZED FOR 65°C TEMPERATURE RISE ABOVE 40°C AMBIENT. E. EACH PANELBOARD SHALL CONTAIN A COPPER EQUIPMENT GROUND BUS, BOLTED TO THE INSIDE OF THE ENCLOSURE, TO ACCEPT ALL OUTGOING EQUIPMENT
- GROUND CONDUCTORS. F. MAIN BUSSES, GROUND BUS, AND THRU FEED BUS SHALL HAVE LUGS TO ACCOMMODATE INCOMING FEEDERS AND GROUNDS AS SHOWN ON THE DRAWINGS. G. CIRCUIT BREAKERS SHALL BE OF THE SWITCH RATED BOLT-ON TYPE WITH OUANTITY, SIZE, AND MINIMUM INTERRUPTING CAPACITY AS NOTED ON DRAWINGS.
- (1) ARRANGE CIRCUIT BREAKERS PER THE PANELBOARD SCHEDULES ON THE DRAWINGS. (2) MAIN BREAKERS, WHERE SPECIFIED, SHALL BE LOCATED AT THE TOP OR BOTTOM OF THE PANEL. BACK-FED BRANCH MOUNTED BREAKERS SHALL NOT BE
- (3) SINGLE-POLE BREAKERS SHALL BE FACTORY MOUNTED AT THE TOP OF THE PANELBOARD ASSEMBLY, UNLESS NOTED OTHERWISE. (4) TWO-POLE AND THREE-POLE BREAKERS SHALL BE FACTORY MOUNTED AT THE BOTTOM OF THE PANELBOARD ASSEMBLY, BELOW ALL SINGLE-POLE BREAKERS,
- H. PANELBOARDS SHALL BE IDENTIFIED WITH AN ENGRAVED NAMEPLATE INSTALLED ON THE FRONT TRIM. REFER TO EQUIPMENT AND EQUIPMENT IDENTIFICATION SPECIFICATION SECTION FOR REQUIREMENTS
- I. PANELBOARD CIRCUITS SHALL BE NUMBERED SEQUENTIALLY WITH ADHESIVE FACTORY LABELS. WHERE PANELBOARDS ARE TWO OR MORE SECTIONS, THE NUMBERING SEQUENCE SHALL BE CONTINUOUS, I.E. SECTION 1 NUMBERED 1 THRU 42, SECTION 2 NUMBERED 43 THRU 84, ETG J. FURNISH AND INSTALL AN ARC FLASH WARNING LABEL IN A CLEARLY VISIBLE LOCATION INSIDE THE HINGED PANEL COVER OF EACH BRANCH CIRCUIT
- PANELBOARD TO COMPLY WITH NEC 110.16. LABELS SHALL BE BRADY IDENTIFICATION SOLUTIONS (1-800-537-8791), CAT. NO. 94913, 3.5" X 5", OR K. WIREWAYS SHALL NOT BE INSTALLED ABOVE BRANCH CIRCUIT PANELBOARDS. (RACEWAYS SHALL TERMINATE DIRECTLY INTO PANELBOARD TUB).
- L. 208/120V (480/277V) BRANCH PANELBOARDS SHALL BE ABB/GE "AQ/(AE/AD)" SERIES, EATON "POW-R-LINE 1A/(2A)", SIEMENS "P1/(P2)" SERIES, OR SQUARE D
- (1) ABB / GENERAL ELECTRIC HINGED FRONT TRIMS SHALL BE "FRONT HINGED TO BOX SERIES".
- (2) EATON HINGED FRONT TRIMS SHALL BE "DOOR IN DOOR LTDD SERIES". EZ-TRIM IS ACCEPTABLE ONLY FOR SURFACE MOUNTED PANELS.
- (3) SIEMENS HINGED FRONT TRIMS SHALL BE "HINGED TO BOX SERIES". (4) SQUARE D HINGED FRONT TRIMS SHALL BE "HINGED FRONT NCHR SERIES".

BRANCH CIRCUIT NUMBERING SYSTEM SHOWN ON THE PLANS

PROVISIONS, AND SPACES, UNLESS NOTED OTHERWISE

- M. SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL.
- 14. DRY TYPE TRANSFORMERS A. DRY TYPE TRANSFORMERS SHALL HAVE KVA AND VOLTAGE RATINGS PER THE DRAWINGS, 150 DEGREE CELSIUS TEMPERATURE RISE, SIX (6) 2-1/2% PRIMARY TAPS (2 ABOVE, 4 BELOW RATED NOMINAL), AND A NEMA 1 INDOOR VENTILATED ENCLOSURE.
- B. WHERE ENCAPSULATED TRANSFORMERS ARE SPECIFIED ON THE DRAWINGS. THEY SHALL HAVE 115 DEGREE CELSIUS TEMPERATURE RISE, FOUR (4) 2-1/2% PRIMARY TAPS (2 ABOVE, 2 BELOW RATED NOMINAL), AND A NEMA 3R OUTDOOR NON-VENTILATED ENCLOSURE.
- C. TRANSFORMERS MUST COMPLY WITH "DOE 2016" EFFICIENCY LEVELS OF THE UNITED STATES DEPARTMENT OF ENERGY CONSERVATION STANDARDS. **ENCAPSULATED TRANSFORMERS ARE EXEMPT**
- D. TRANSFORMERS MANUFACTURERS SHALL BE: ABB/GE, ACME ELECTRIC, EATON, FEDERAL PACIFIC, POWERSMITHS E-SAVER 33L, SIEMENS, OR SQUARE D. E. CONNECTIONS TO TRANSFORMERS SHALL UTILIZE A SHORT LENGTH OF FLEXIBLE METAL CONDUIT.
- A. FURNISH AND INSTALL CONDUIT, SUPPORTS, BOXES, WIRE, AND NECESSARY FITTINGS AND ACCESSORIES AS REQUIRED TO MAKE A COMPLETE INSTALLATION OF THE WIRING SYSTEM INDICATED ON THE DRAWINGS.
- B. ALL WIRING SHALL BE INSTALLED IN CONDUIT, FLEXIBLE METALLIC CONDUIT, OR LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT AS INDICATED ON PLANS. (1) CONDUITS INSTALLED INDOORS SHALL BE ELECTRICAL METALLIC TUBING GALVANIZED INSIDE AND OUT WITH A CLEAR TOP COAT TO RESIST ABRASION AND
- (2) CONDUITS INSTALLED EXPOSED OUTDOORS SHALL BE GALVANIZED RIGID TYPE UNLESS NOTED OTHERWISE. EXPANSION JOINTS SHALL BE INCORPORATED CONDUITS SHALL BE OF THE SIZE INDICATED OR REQUIRED BY THE NATIONAL ELECTRIC CODE FOR THE NUMBER AND SIZE CONDUCTORS INVOLVED. JOINTS SHALL BE CUT SQUARE, REAMED SMOOTH AND PULLED UP TIGHT. CONDUITS SHALL NOT BE SMALLER THAN 3/4", UNLESS NOTED OTHERWISE.
- (3) EMT CONDUIT FITTINGS SHALL BE SET SCREW TYPE GALVANIZED STEEL, CONCRETE TIGHT. DIE CAST TYPE INDENTOR FITTINGS ARE NOT ACCEPTABLE. C. REFER TO THE CONDUCTORS SECTION OF THIS SPECIFICATION FOR LIMITED USE OF MC CABLE D. RACEWAYS FROM VARIABLE FREQUENCY DRIVES SHALL CONTAIN "VFD RATED" MULTI-CONDUCTOR SHIELDED CABLE AND, WHERE NOT SUBJECT TO PHYSICAL DAMAGE, UP TO 6-FEET OF VFD CABLE MAYBE ROUTED EXPOSED TO ALLOW CABLE TERMINATION AT MOTORS.
- (1) THREADED INSULATED BUSHINGS SHALL BE USED TO TERMINATE VFD RACEWAYS (2) INSULATED, NON-ARMORED, WEATHERPROOF, TRAY CABLE TYPE CABLE GLANDS SHALL BE USED TO TRANSITION EXPOSED VFD CABLE TO RACEWAY AND FOR
- E. RACEWAYS IN GENERAL SHALL BE INSTALLED CONCEALED ABOVE FINISHED CEILINGS, IN WALLS, IN ACCESSIBLE FLOOR PLENUMS, AND EXPOSED ELSEWHERI
- (1) PVC CONDUIT AND LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT SHALL NOT BE USED IN ENVIRONMENTAL AIR PLENUMS. (2) CONDUITS INSTALLED ON EXTERIORS OF BUILDINGS OR OTHER STRUCTURES SHALL BE ARRANGED TO DRAIN (NOT TRAP WATER), AND SHALL BE RAIN-TIGHT IN WET LOCATIONS (3) WHERE CONDUITS ARE ROUTED THROUGH AREAS OF DIFFERING TEMPERATURES OR AIR PRESSURES (AIR HANDLERS, EXTERIOR WALLS, ETC.). THE
- PENETRATION AROUND THE CONDUIT SHALL BE ADEQUATELY SEALED. THE INTERIOR OF THESE CONDUITS SHALL BE SEALED AT THE FIRST BOX OR FITTING ADJACENT TO THE PENETRATION TO PREVENT AIR MIGRATION BETWEEN THE SPACES. F. ALL EXPOSED CONDUITS SHALL BE RUN IN A NEAT MANNER, PARALLEL WITH OR AT RIGHT ANGLES TO BUILDING LINES. EXPOSED CONDUITS SHALL BE ADEQUATELY SUPPORTED WITH BEAM CLAMPS, ONE HOLE STRAPS, ETC.
- (1) WHERE ENCOUNTERED, STEEL FIREPROOFING SHALL BE REPAIRED BY THE ELECTRICAL CONTRACTOR WHERE SUPPORTS ARE INSTALLED ON EXISTING STEEL G. ALL ELECTRICAL SYSTEMS, RACEWAYS, JUNCTION BOXES, CABLES, AND ALL FLEXIBLE WIRING SYSTEMS SHALL BE SUPPORTED INDEPENDENT OF THE

SUSPENDED TEE-BAR CEILING SYSTEM AND INDEPENDENT OF HANGER WIRES ASSOCIATED WITH THE CEILING SYSTEM, IN FULL COMPLIANCE WITH THE

- H. RACEWAYS THAT ARE INSTALLED EXPOSED TO DIRECT SUNLIGHT ON ROOFTOPS SHALL HAVE 60°F ADDED TO THE OUTDOOR AMBIENT TEMPERATURE USED TO CALCULATE THE CONDUCTOR DERATING FACTOR IN COMPLIANCE WITH NEC ARTICLE 310.15(B).
- A. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE STRANDED COPPER WITH NOT LESS THAN 98% CONDUCTIVITY AND 600 VOLT TYPE THWN OR XHHW INSULATION. CONDUCTORS SHALL BE #12 AWG UNLESS INDICATED OTHERWISE ON PLANS.
- (1) WHERE THE DRAWINGS ALLOW USE OF ALUMINUM CONDUCTORS THEY SHALL BE AA-8000 SERIES ALLOY COMPACT STRANDED TYPE. TERMINATIONS SHALL BE MADE USING NOALOX ANTI-OXIDANT COMPOUND B. TYPE THHN OR XHHW (90°C) INSULATED STRANDED COPPER CONDUCTORS SHALL BE USED WHERE BRANCH CIRCUIT CONDUCTORS ARE ROUTED THRU
- FLUORESCENT FIXTURE CHANNELS C. UNLESS SPECIFICALLY NOTED OTHERWISE ON THE ELECTRICAL BID DOCUMENTS, THE ELECTRICAL CONTRACTOR SHALL NOT INSTALL TYPE AC ARMORED CABLE TYPE FC FLAT CABLE, TYPE FCC FLAT CONDUCTOR CABLE, TYPES NM / NMC / NMS NONMETALLIC SHEATHED CABLE, TYPES SE / USE SERVICE CABLE OR TYPE UF UNDERGROUND FEED CABLE. REFER BELOW FOR LIMITED USE OF MC CABLE.
- D. FEEDER CONDUCTORS SHALL BE ROUTED CONTINUOUS FROM ORIGIN TO DESTINATION, WITHOUT SPLICING, UNLESS SPECIFICALLY NOTED OTHERWISE ON PLANS. FEEDER CONDUCTORS SHALL BE PULLED WITH THE USE OF AN APPROVED PULLING COMPOUND OR POWDER. E. "VFD RATED" MULTI-CONDUCTOR SHIELDED CABLES SHALL BE TERMINATED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS. BRAIDED SHIELDS
- SHALL BE ROUTED UNBROKEN WHERE SERVICE DISCONNECTS ARE LOCATED BETWEEN THE VFD AND MOTOR. PHASE AND GROUND CONDUCTORS SHALL BE PULLED THROUGH BRAIDED SHIELDS AT EACH END AND TERMINATED TOGETHER WITH THE GROUND CONDUCTORS. F. METAL CLAD CABLE (NEC TYPE MC) (1) METAL CLAD CABLE (MC CABLE) MAY ONLY BE USED WHERE PERMITTED BY THE NEC, LOCAL CODES AND THE FOLLOWING LIMITATIONS.
- (A) FOR BRANCH CIRCUIT WIRING FISHED INTO EXISTING WALLS OR INACCESSIBLE CEILINGS AND IN CASEWORK. (MC CABLE SHALL NOT BE INSTALLED (B) FOR LIGHTING, RECEPTACLE AND EQUIPMENT BRANCH CIRCUIT WIRING WITH-IN A ROOM, WHERE CONCEALED IN WALLS AND ABOVE FINISHED CEILINGS. ALL ASSOCIATED "HOME RUN" WIRING SHALL BE INSTALLED IN CONDUIT.
- (E) MC CABLE IS NOT PERMITTED FOR EMERGENCY POWER CIRCUITS, EXCEPT WHERE FISHED INTO EXISTING WALLS OR INACCESSIBLE CEILINGS. (F) UNGROUNDED CONDUCTORS SHALL BE IDENTIFIED PER NEC 210.5.C. (2) MC CABLE SHALL BE UL LISTED FOR ITS USE. WHERE MC CABLE IS INSTALLED IN HEALTHCARE FACILITIES (AS DEFINED BY THE NEC), THE CABLE ASSEMBLY SHALL BE LISTED FOR USE IN PATIENT CARE AREAS (HCF).
- G. FURNISH AND INSTALL CODE GAUGE SCREW COVER PULL BOXES AND TYPE LB CONDUIT FITTINGS WHERE SHOWN ON PLANS AND AS REQUIRED FOR THE SATISFACTORY INSTALLATION OF ALL FEEDER CONDUCTORS. H. SPLICES IN BRANCH CIRCUIT WIRES SHALL BE MADE ONLY IN READILY ACCESSIBLE JUNCTION BOXES. (1) IN-LINE SPLICES AND TAPS FOR CONDUCTORS #8 AWG OR SMALLER SHALL BE 600V RATED WITH "LIVE SPRING" AND INSULATED RIGID NYLON WING TYPE
- BODY, 3M "RANGER", BUCHANAN "B-CAP", OR EQUAL. (2) IN-LINE CONNECTORS FOR 600V COPPER CONDUCTORS #6 AWG THRU #3 AWG SHALL BE ILSCO TYPE "CT" CIRCUMFERENTIAL COMPRESSION SLEEVES OR EQUAL BY T & B OR BUCHANAN (3) IN-LINE CONNECTORS FOR 600V COPPER CONDUCTORS #2 AWG OR LARGER SHALL BE EXTRA LONG BARREL ILSCO TYPE "CTL" COMPRESSION SLEEVES (OR
- I. CIRCUIT CONDUCTORS SHALL BE CONNECTED AT PANELBOARDS AS INDICATED ON THE DRAWINGS. PANELBOARD LOADS SHALL BE CHECKED AT COMPLETION OF THE JOB AND WHERE UNBALANCE EXCEEDS 5% (PLUS OR MINUS) ADJUSTMENTS SHALL BE MADE. J. ALL MULTI-WIRE BRANCH CIRCUITS THAT FEED MORE THAN ONE DEVICE OR EQUIPMENT MOUNTED ON, OR WIRED FROM, A COMMON YOKE, SHALL BE POWERED FROM A BRANCH CIRCUIT OVERCURRENT DEVICE THAT SIMULTANEOUSLY DISCONNECTS ALL UNGROUNDED SUPPLY CONDUCTORS IN FULL COMPLIANCE WITH
- K. EACH FEEDER AND BRANCH CIRCUIT ASSOCIATED WITH A TWO-POLE OR THREE-POLE PROTECTIVE DEVICE SHALL BE PROVIDED WITH A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR. THE REQUIRED EQUIPMENT GROUNDING CONDUCTOR SHALL BE SIZED AS SHOWN ON THE DRAWINGS. SHALL NOT BE SMALLER THAN SHOWN IN NEC TABLE 250.122, AND SHALL BE INSTALLED IN A COMMON CONDUIT WITH THE RELATED PHASE AND/OR NEUTRAL CONDUCTORS. IN THE CASE OF PARALLEL FEEDERS, EACH RACEWAY SHALL HAVE A FULL SIZE GREEN INSULATED EQUIPMENT GROUND CONDUCTOR.
- L. BRANCH CIRCUIT CONDUCTORS SHALL BE COLOR CODED. CONDUCTOR INSULATION SHALL BE FACTORY COLORED IN SIZES UP THROUGH #8 AWG. COLORS SHALL BE ASSIGNED TO EACH CONDUCTOR AS DESCRIBED BELOW AND CARRIED THROUGHOUT ALL MAIN AND BRANCH CIRCUIT DISTRIBUTION. (1) PHASE "A" CONDUCTOR BLACK (2) PHASE "B" CONDUCTOR (3) PHASE "C" CONDUCTOR WHITE

GREEN

EQUAL BY T & B OR BUCHANAN) WITH 3M BRAND "PST" SILICONE COLD SHRINK INSULATORS.

(C) MC CABLE SHALL NOT BE INSTALLED EXPOSED ON WALLS

(D) MC CABLE IS NOT PERMITTED FOR FEEDER CIRCUITS.

(4) NEUTRAL CONDUCTOR

(5) GROUNDING CONDUCTOR

(6) ISOLATED GROUNDING CONDUCTOR GREEN WITH YELLOW STRIPE M. IN GENERAL, 120V AND 277V SINGLE PHASE CIRCUITS SHALL BE PROVIDED WITH DEDICATED NEUTRALS AND CONNECTED TO SINGLE POLE BREAKERS. N. CIRCUITS INSTALLED FOR MODULAR TYPE FURNITURE SHALL BE CONNECTED TO A SINGLE-POLE BREAKER WITH A DEDICATED NEUTRAL, WITHOUT EXCEPTION. O. WHERE MORE THAN ONE NOMINAL VOLTAGE SYSTEM IS PRESENT WITHIN A PREMISES, THE IDENTIFICATION USED FOR EACH PHASE, NEUTRAL, AND GROUND

GRAY

GREEN

CONDUCTORS SHALL BE PERMANENTLY POSTED AT EACH DISTRIBUTION PANEL AND AT EACH BRANCH PANEL. P. CONTROL WIRING SHALL BE COLOR CODED SUCH THAT RED IS USED EXCLUSIVELY FOR ALL 120 VOLT CONDUCTORS AND WHITE FOR ALL NEUTRAL CONDUCTORS. ALL CONTROL WIRING TO BE IDENTIFIED AT BOTH ENDS WITH PERMANENT WIRE MARKERS

- 17. OUTLET BOXES A. CONCEALED OUTLET BOXES FOR LIGHTING FIXTURES IN SUSPENDED CEILING AREAS SHALL BE 4" OCTAGON BY 1-1/2" DEEP. WHERE NUMBER OF WIRES REOUIRES A LARGER BOX, USE 4-11/16" OR 4" SOUARE BY 2-1/8" DEEP. BOXES SHALL BE PROVIDED WITH ROUND OPENING PLASTER COVERS TO FINISH FLUSH WITH CEILING. PROVIDE 3/8" FIXTURE STUDS.
- B. OUTLET BOXES LOCATED ABOVE ACCESSIBLE CEILINGS FOR LIGHTING FIXTURES SHALL BE PROVIDED WITH BLANK COVERS. WIRING SHALL BE EXTENDED TO FIXTURES IN FLEXIBLE METAL CONDUIT WITH GROUND WIRE
- C. OUTLET BOXES FOR WIRING DEVICES SHALL BE 4" SQUARE BY 1-1/2" DEEP. WHERE NUMBER OF WIRES REQUIRES A LARGER BOX, USE 4" SQUARE BY 2-1/8" DEEP. PROVIDE ONE OR TWO GANG ADAPTERS AS REQUIRED, TO FINISH FLUSH WITH WALL. WHERE THREE OR MORE DEVICES ARE SET AT ONE POINT, USE GANG TYPE BOXES. D. JUNCTION BOXES SHALL BE BONDED TO THE EQUIPMENT GROUND CONDUCTORS CONTAINED WITHIN, WHENEVER SAID CONDUCTORS ARE "SPLICED" OR
- E. ALL BOXES SHALL BE RIGIDLY SUPPORTED FROM THE BUILDING STRUCTURE INDEPENDENT OF THE CONDUIT SYSTEM. F. ELECTRICAL CONTRACTOR SHALL PROVIDE PRE-PAINTED RED. SPRAY PAINTED RED. OR RED COLORED STICK-ON LABELS FOR ALL FIRE ALARM SYSTEM JUNCTION BOXES AND COVERS.
- 18. WIRING DEVICES AND COVERPLATES A. WIRING DEVICES SHALL BE FURNISHED AS DESCRIBED IN THE SYMBOL SCHEDULE AND INSTALLED AT LOCATIONS SHOWN ON THE DRAWINGS. WIRING DEVICES TO BE COOPER "INDUSTRIAL SPEC GRADE", HUBBELL "HBL" SERIES, LEVITON "LEV-SPEC", OR PASS & SEYMOUR "INDUSTRIAL SPEC GRADE".

TERMINATED" WITHIN THE BOX, IN FULL COMPLIANCE WITH NEC ARTICLE 250.148.

(1) DEVICES SHALL HAVE ONE-PIECE BRASS MOUNTING STRAP

APPLETON TYPE "FSK".

D. GENERAL:

- (2) DEVICES SHALL BE "IVORY" IN COLOR UNLESS INDICATED OTHERWISE ON PLANS. B. COVERPLATES FOR FLUSH MOUNTED AND SURFACE MOUNTED DEVICES IN WIREMOLD BOXES SHALL BE 0.04" THICK BRUSHED FINISH, STAINLESS STEEL.
- WHERE TWO OR MORE DEVICES ARE SET AT ONE POINT, THEY SHALL BE COVERED WITH A COMMON PLATE. C. COVERPLATES FOR DEVICES SHALL BE SMOOTH IVORY COLORED NYLON NON-BREAKABLE TYPE. WHERE TWO OR MORE DEVICES ARE SET AT ONE POINT, THEY SHALL BE COVERED WITH A COMMON PLATE.
- D. WHERE DECORATIVE SCREW-LESS COVERPLATE SWITCHES OR DIMMERS ARE LOCATED ADJACENT TO STANDARD TOGGLE SWITCHES THEY SHALL BE INSTALLED E. COVERPLATES FOR SURFACE MOUNTED DEVICES IN CAST FS BOXES SHALL BE HEAVY-GAUGE GALVANIZED STAMPED SHEET STEEL, CROUSE HINDS TYPE "DS" OR
- 19. LIGHTING A. FURNISH AND INSTALL LIGHTING FIXTURES AND LAMPS AS INDICATED IN THE FIXTURE SCHEDULE ON THE DRAWINGS. LAMPS SHALL BE BY GENERAL ELECTRIC, OSRAM/SYLVANIA, OR PHILLIPS LIGHTING.
- B. FURNISH AND INSTALL ALL REQUIRED HANGING ACCESSORIES AND FITTINGS TO ENSURE PROPER INSTALLATION AND CONFORMANCE WITH THE CODE. (1) ALL FIXTURE SUPPORTS SHALL BE CAPABLE OF SUPPORTING THE FIXTURE PLUS 100% ADDITIONAL WEIGHT (2) THE ELECTRICAL CONTRACTOR SHALL TAKE SPECIAL NOTE OF THE VARIOUS TYPES OF CEILING CONSTRUCTION USED THROUGHOUT THE BUILDING SO THAT PROPER MOUNTING ARRANGEMENTS ARE MADE FOR LIGHTING FIXTURES.
- (3) SURFACE TYPE FIXTURES WHICH MOUNT ON GRID CEILINGS SHALL BE SUPPORTED FROM METAL SUPPORTING MEMBERS (FURNISHED BY THE ELECTRICAL CONTRACTOR) LOCATED ABOVE GRID CEILING. C. FIXTURE FRAMES SHALL BE GROUNDED TO THE CONDUIT SYSTEM EITHER THROUGH THE HANGING DEVICE OR BY MEANS OF A #14 GREEN JUMPER.
- (1) LUMINAIRE MANUFACTURER SHALL HAVE A MINIMUM OF FIVE (5) YEARS EXPERIENCE IN THE MANUFACTURE AND DESIGN OF LED PRODUCTS AND SYSTEMS AND NO LESS THAN ONE HUNDRED (100) NORTH AMERICAN INSTALLATIONS. (2) UNLESS OTHERWISE SPECIFIED, ALL LED LUMINAIRES AND POWER/DATA SUPPLIES SHALL BE PROVIDED BY A SINGLE MANUFACTURER TO ENSURE
- (3) ALL COMPONENTS, PERIPHERAL DEVICES AND CONTROL SOFTWARE ARE TO BE PROVIDED BY AND SHALL BE THE RESPONSIBILITY OF A SINGLE ENTITY. ALL COMPONENTS SHALL PERFORM SUCCESSFULLY AS A COMPLETE SYSTEM AND SHALL OPERATE AS DESCRIBED ON THE DRAWINGS. (4) INCLUDE ALL COMPONENTS NECESSARY FOR A COMPLETE INSTALLATION. PROVIDE ALL POWER SUPPLIES, SYNCHRONIZERS, DATA CABLES, AND DATA TERMINATORS FOR A COMPLETE WORKING SYSTEM.
- (5) ALL LED SOURCES USED IN THE LED LUMINAIRE SHALL BE OF PROVEN QUALITY FROM ESTABLISHED AND REPUTABLE LED MANUFACTURERS AND SHALL HAVE BEEN FABRICATED AFTER 2007. E. LIGHTING/RECEPTACLE CONTROL PANEL SHALL HAVE QUANTITY OF PROGRAMMABLE RELAYS AS IDENTIFIED ON DRAWINGS. NEMA-1 SURFACE MOUNTED ENCLOSURE AND DIGITAL TIME CLOCK. NLIGHT #ARP OR APPROVED EQUAL.
- (1) SYSTEM SHALL CARRY A FULL WARRANTY FOR FIVE (5) YEARS. MANUFACTURER SHALL BE RESPONSIBLE FOR COST OF SHIPPING AND LABOR TO REPLACE ANY COMPONENT OF THE SYSTEM THAT FAILS WITHIN 2 YEARS OF INSTALLATION.
- G. PRODUCTS AND COMPONENTS PERFORMANCE
- (1) LED LUMINAIRES AND COMPONENTS SHALL BE UL LISTED OR UL CLASSIFIED.

CONNECTIONS ARE REVERSED OR SHORTED DURING THE INSTALLATION PROCESS.

(2) ALL LED COMPONENTS SHALL BE RESTRICTION OF HAZARDOUS SUBSTANCE DIRECTIVE (ROHS) COMPLIANT (3) WHITE LEDS SHALL HAVE A RATED SOURCE LIFE OF 50,000 HOURS UNDER NORMAL OPERATING CONDITIONS. RGB LEDS SHALL HAVE A RATED SOURCE LIFE OF 100,000 HOURS. LED "RATED SOURCE LIFE" IS DEFINED AS THE TIME WHEN A MINIMUM OF 70% OF INITIAL LUMEN OUTPUT REMAINS

(4) LUMINAIRE ASSEMBLY SHALL INCLUDE A METHOD OF DISSIPATING HEAT SO AS TO NOT DEGRADE LIFE OF SOURCE, ELECTRONIC EQUIPMENT, OR LENSES.

- LED LUMINAIRE HOUSING SHALL BE DESIGNED TO TRANSFER HEAT FROM THE LED BOARD TO THE OUTSIDE ENVIRONMENT. LUMINAIRE HOUSING SHALL HAVE NO NEGATIVE IMPACT ON LIFE OF COMPONENTS. (5) LEDS SHALL BE ADEQUATELY PROTECTED FROM MOISTURE OR DUST IN INTERIOR APPLICATIONS. (6) ALL HARDWIRED CONNECTIONS TO LED LUMINAIRES SHALL BE REVERSE POLARITY PROTECTED AND PROVIDE HIGH VOLTAGE PROTECTION IN THE EVENT
- SPECIFIED NOMINAL VOLTAGE AND CURRENT. 20. LIGHTING CONTROLS A. THE CONTRACTOR SHALL REVIEW THE PROPOSED LIGHTING CONTROLS WITH THE MANUFACTURERS TECHNICIAN AND PROCURE FACTORY ONE-LINES. INCLUDE

(7) THE LED LUMINAIRE SHALL BE OPERATED AT CONSTANT AND CAREFULLY REGULATED CURRENT LEVELS. LEDS SHALL NOT BE OVERDRIVEN BEYOND THEIR

- FACTORY ONE-LINES IN LIGHTING CONTROL SHOP DRAWING SUBMITTALS. B. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF THE MANUFACTURERS FIELD SERVICE TECHNICIAN TO PERFORM ALL PROGRAMMING, STARTUP, CALIBRATION, AND CERTIFICATION OF THE LIGHTING CONTROL SYSTEM. C. ALL SYSTEM PROGRAMMING SHALL BE REVIEWED AND APPROVED BY THE OWNER IN ADVANCE. AN OWNER'S REPRESENTATIVE SHALL BE PRESENT THROUGHOUT
- THE PROGRAMMING AND STARTUP PROCEDURES. D. THE CONTRACTOR SHALL PROVIDE LABOR TO PROGRAM EACH OCCUPANCY SENSOR AND DAYLIGHT SENSOR AS NECESSARY FOR INTERFACE WITH THE SYSTEM. E. WHERE ROOMS ARE DIVIDED WITH OPERABLE PARTITIONS, THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A SYSTEM WITH AN OPTICAL PARTITION SWITCH TO ALLOW INDIVIDUAL ROOM CONTROLS WHEN THE PARTITION IS CLOSED AND COMMON ROOM CONTROLS WHEN THE PARTITION IS OPEN.
- A. FURNISH AND INSTALL POWER WIRING TO ALL HEATING, VENTILATING, AND AIR CONDITIONING EQUIPMENT. CHECK HEATING AND VENTILATING DRAWINGS TO
- BE FAMILIAR WITH ALL POWER REQUIREMENTS AND ELECTRICAL ROUGH-IN LOCATIONS. B. ALL TEMPERATURE CONTROL WIRING SHALL BE FURNISHED AND INSTALLED BY MECHANICAL TRADES UNDER SEPARATE CONTRACT UNLESS OTHERWISE SHOWN ON THE ELECTRICAL PLANS. C. MOTOR STARTERS SHALL BE FURNISHED INTERNAL TO THE HVAC EQUIPMENT EXCEPT WHERE OTHERWISE NOTED ON THE ELECTRICAL DRAWINGS.
- E. CONNECTIONS TO MOTORS SHALL BE MADE WITH A SHORT LENGTH (24" MINIMUM) OF LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT. A. THIS CONTRACTOR SHALL PROVIDE PERSONNEL AND EQUIPMENT TO CHECK LOADS AND ADJUST AS REQUIRED TO ENSURE THAT CONNECTED LOADS ARE

D. ALL MOTORS SHALL BE GROUNDED IN ACCORDANCE WITH NATIONAL ELECTRIC CODE REQUIREMENTS. DISCONNECT MEANS SHALL BE SUPPLIED AS REQUIRED

- BALANCED AS NEARLY AS POSSIBLE BETWEEN PHASES ON ALL FEEDERS. B. SPECIAL CARE SHALL BE TAKEN DURING LOAD BALANCE TO ASSURE THAT REVERSE ROTATION OF MOTORS IS NOT CAUSED.
- A. FURNISH AND INSTALL GROUND CONDUCTORS AS INDICATED ON THE DRAWINGS. CONDUCTORS SHALL BE INSULATED COPPER, TYPE THWN, IDENTIFIED GREEN, AND SIZED AS SHOWN ON THE DRAWINGS B. METALLIC CONDUIT SYSTEM SHALL BE ELECTRICALLY CONTINUOUS THROUGHOUT C. EACH FEEDER AND BRANCH CIRCUIT ASSOCIATED WITH A TWO-POLE OR THREE-POLE PROTECTIVE DEVICE SHALL BE PROVIDED WITH A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR. THE REQUIRED EQUIPMENT GROUNDING CONDUCTOR SHALL BE SIZED AS SHOWN ON THE DRAWINGS
- SHALL NOT BE SMALLER THAN SHOWN IN NEC TABLE 250.122, AND SHALL BE INSTALLED IN A COMMON CONDUIT WITH THE RELATED PHASE AND/OR NEUTRAL CONDUCTORS. IN THE CASE OF PARALLEL FEEDERS, EACH RACEWAY SHALL HAVE A FULL SIZE GREEN INSULATED EQUIPMENT GROUND CONDUCTOR. 24. LOW VOLTAGE AND COMMUNICATIONS RACEWAY PROVISIONS

A. FURNISH AND INSTALL A SYSTEM OF RACEWAYS AND OUTLETS FOR THE INSTALLATION OF VOICE/DATA CABLING AND SIMILAR LOW VOLTAGE SYSTEMS.

- B. CONDUITS SHALL BE SIZED AS SHOWN ON THE DRAWINGS AND SHALL CONFORM TO "RACEWAYS" SPECIFICATION C. OUTLETS SHALL BE AS DESCRIBED IN THE SYMBOL SCHEDULE ON THE DRAWINGS D. RACEWAYS SHALL UTILIZE LONG SWEEP 90° BENDS AT ALL LOCATIONS WHERE ELBOWS ARE REQUIRED (2 FOOT MINIMUM RADIUS ON ALL BENDS).
- E. ALL RACEWAYS SHALL BE TERMINATED WITH INSULATING BUSHINGS. ALL RACEWAYS LEFT WITHOUT CABLING SHALL CONTAIN NYLON PULL WIRE F. WIRING SHALL BE INSTALLED BY OTHERS.
- A. FURNISH AND INSTALL HEAVY DUTY DISCONNECT SWITCHES AT THE LOCATIONS SHOWN ON THE DRAWINGS
- B. ENCLOSURES SHALL BE NEMA TYPE 1 IN DRY LOCATIONS, AND NEMA TYPE 3R (RAIN-TIGHT) IN DAMP LOCATIONS, WET LOCATIONS, OR WHERE EXPOSED TO
- C. CURRENT RATINGS, NUMBER OF POLES, AND ASSOCIATED VOLTAGE SHALL BE AS INDICATED ON THE DRAWINGS. D. EACH ENCLOSURE SHALL CONTAIN A FACTORY GROUND LUG TO ACCEPT INCOMING AND OUTGOING GROUND CONDUCTORS
- E. SWITCHES SHALL BE ARRANGED FOR CLASS J FUSES OR CONTAIN CLASS R REJECTION CLIPS TO ACCEPT ONLY CURRENT-LIMITING FUSES WHERE FUSED DISCONNECTS ARE SPECIFIED. F. FURNISH AND INSTALL AN ENGRAVED NAMEPLATE ON FRONT TRIM OF EACH DISCONNECT SWITCH TO IDENTIFY LOAD SERVED. REFER TO EQUIPMENT AND EQUIPMENT IDENTIFICATION SPECIFICATION SECTION FOR REQUIREMENTS.
- G. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE BY EATON, ABB/GE, SIEMENS, OR SQUARE D.
- A. FUSES SHALL NOT BE INSTALLED UNTIL EQUIPMENT IS READY TO BE ENERGIZED. ALL FUSES SHALL BE OF THE SAME MANUFACTURER TO ASSURE B. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A COMPLETE SET OF FUSES FOR ALL FUSIBLE EQUIPMENT ON THE JOB. UNLESS OTHERWISE NOTED, ALL FUSES SHALL BE UL LISTED, CURRENT-LIMITING AND HAVE AN INTERRUPTING RATING OF 200,000 RMS AMPERES SYMMETRICAL.

C. ALL FUSES RATED 600 AMPERES OR LESS SHALL BE TIME-DELAY CURRENT-LIMITING UL CLASS J, UNLESS OTHERWISE NOTED. THEY SHALL BE:

(1) BUSSMANN LOW PEAK; LPJ (2) LITTLEFUSE POWER PRO; JTD

25. DISCONNECT SWITCHES

TO SATISFY THE CODE REQUIREMENTS.

(3) MERSEN AMP-TRAP 2000; AJ7 D. INSTALL PROPER SIZE AND PROPER TYPE FUSES IN ALL FUSIBLE EQUIPMENT.

(2) LABELS SHALL BE INSTALLED ON INTERIOR TRIM OF ALL BRANCH CIRCUIT PANELBOARDS

- 27. EMERGENCY POWER SYSTEM A. A LABEL READING "CONTAINS EMERGENCY CIRCUITS" SHALL BE INSTALLED ON ALL BOXES AND ENCLOSURES THAT CONTAIN EMERGENCY POWERED CIRCUITS TO COMPLY WITH NEC 700-10. (1) LABELS SHALL BE INSTALLED ON FRONT COVERS OF ALL PULLBOXES, JUNCTION BOXES AND CONTROL ENCLOSURES
- A. THE ELECTRICAL CONTRACTOR SHALL FURNISH, INSTALL, AND PLACE IN OPERATING CONDITION AN ELECTRICALLY-OPERATED, SUPERVISED, AUTOMATED FIRE DETECTION ALARM SYSTEM AS DESCRIBED IN THESE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS. EQUIPMENT PROVIDED UNDER THIS SPECIFICATION SHALL INCLUDE ALL DEVICES REQUIRED TO PROVIDE A COMPLETELY OPERABLE SYSTEM. B. THE SYSTEM FURNISHED UNDER THIS SPECIFICATION SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THE FOLLOWING STANDARDS AND CODES:
- (1) NFPA 70, NATIONAL ELECTRICAL CODE (2) NFPA 72, NATIONAL FIRE ALARM CODE
- (3) STATE CODES
- (4) LOCAL CODES (5) SYSTEM SHALL BE UL LISTED
- C. THE EQUIPMENT SHALL BE AS MANUFACTURED BY SIMPLEX GRINNELL, NOTIFIER, EDWARDS EST, OR SIEMENS. D. THE EQUIPMENT MANUFACTURER SHALL HAVE A LOCAL BRANCH OFFICE STAFFED WITH TRAINED, FULL-TIME EMPLOYEES WHO ARE CAPABLE OF PERFORMING
- TESTING, INSPECTION, REPAIR, AND MAINTENANCE SERVICE FOR THE FIRE DETECTION SYSTEM. E. ALL COMPONENTS, PARTS AND ASSEMBLIES SUPPLIED BY THE MANUFACTURER SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF 12 MONTHS. WARRANTY SERVICE SHALL BE PROVIDED BY A TRAINED SPECIALIST OF THE EQUIPMENT MANUFACTURER. THE SPECIALIST SHALL BE BASED IN A FULLY STAFFED BRANCH OFFICE LOCATED WITHIN A REASONABLE DISTANCE FROM THE 10B SITE.
- F. PRIOR TO INSTALLATION OF ANY EQUIPMENT OR RACEWAYS, SUBMIT SHOP DRAWINGS FOR APPROVAL. DRAWINGS SHALL INCLUDE: (1) EQUIPMENT BROCHURE WITH SPECIFICATION SHEETS INCLUDING CUSTOM LABELING DESIGNATION.
- (2) DEVICE WIRING DIAGRAMS WITH REQUIRED COLOR CODING NOTED. (3) FLOOR PLANS WITH WIRING, DEVICE ADDRESSES AND SYMBOL SCHEDULE (4) RISER DIAGRAMS WITH WIRE FILL NOTED.

- (5) BATTERY CALCULATIONS (PER NFPA 72) AND A LISTING OF SPARE CAPACITY ON EACH POWER SUPPLY IN THE SYSTEM UNDER NORMAL AND ALARM (6) COMPLETE DESCRIPTION OF SYSTEM OPERATION.
- (7) LISTING OF ALL MATERIALS FURNISHED WITH THE SYSTEM.
- G. PROVIDE ON-SITE TRAINING FOR MINIMUM OF FOUR (4) PERSONS ON SYSTEM OPERATION AND SYSTEM RESET. THIS TRAINING SHALL INCLUDE A MINIMUM OF FOUR (4) HOURS DEDICATED INSTRUCTOR TIME
- (1) EQUIPMENT SUPPLIER SHALL BE RESPONSIBLE FOR THE INITIAL PROGRAMMING REQUIRED TO MAKE THE SYSTEM PERFORM AS OUTLINED UNDER SYSTEM OPERATION OF THIS SPECIFICATION. (2) CUSTOM LABEL MESSAGES FOR THE INDIVIDUAL ZONES SHALL BE DEFINED BY THE OWNER AN SHALL BE PROGRAMMED BY THE SUPPLIER. THE OWNER
- RESERVES THE RIGHT TO REQUEST MINOR CHANGES IN THE OPERATION WITHOUT INCURRING ADDITIONAL EXPENSE.
- (1) UPON ACTUATION OF ANY ALARM INITIATION DEVICE (MANUAL STATION, CEILING OR DUCT SMOKE DETECTOR, WATERFLOW SWITCH, OR FIRE SUPPRESSION PANEL). THE FOLLOWING DESCRIBED EVENTS SHALL OCCUR:
- (A) DISPLAY THE ALARM CONDITION AND SOUND THE AUDIBLE TONE AT THE CONTROL PANEL. (B) DISPLAY THE ALARM CONDITION AND SOUND THE AUDIBLE TONE AT ALL ANNUNCIATORS.
- (D) AUDIO/VISUAL DEVICES SHALL ACTIVATE SOUND AND SYNCHRONIZED FLASH OF STROBES. SOUND MAY BE SILENCED WHILE THE VISUAL INDICATOR SHALL REMAIN FLASHING UNTIL THE SYSTEM IS RESET (E) THE AIR HANDLING UNIT SHALL BE SHUT DOWN (DUCT DETECTOR ALARM ONLY).
- (2) UPON ACTIVATION OF THE ELEVATOR EQUIPMENT ROOM SMOKE DETECTOR, ELEVATOR LOBBY SMOKE DETECTOR, OR ELEVATOR SHAFT SMOKE DETECTOR, THE FIRE ALARM SYSTEM SHALL SEND THE ASSOCIATED ELEVATOR TO THE MAIN EGRESS LEVEL. IN THE EVENT THAT THE ELEVATOR LOBBY SMOKE DETECTOR ON THE MAIN EGRESS LEVEL IS ACTIVATED, THE ELEVATOR SHALL BE SENT TO AN ALTERNATE FLOOR AS DESIGNATED BY THE OWNER. (3) UPON ACTIVATION OF THE ELEVATOR EQUIPMENT ROOM HEAT DETECTORS THE ELEVATOR SHUNT TRIP MECHANISM SHALL BE ACTIVATED AND SHUNT TRIP
- (6) THE FIRE ALARM SYSTEM SHALL ALLOW FOR LOADING AND EDITING SPECIAL INSTRUCTIONS AND OPERATING SEQUENCES AS REQUIRED. THE SYSTEM SHALL BE CAPABLE OF ON-SITE PROGRAMMING TO ACCOMMODATE SYSTEMS EXPANSION AND FACILITATE CHANGES IN OPERATION. ALL SOFTWARE OPERATIONS SHALL BE STORED IN A NON-VOLATILE PROGRAMMABLE MEMORY WITHIN THE FIRE ALARM CONTROL PANEL, LOSS OF PRIMARY AND SECONDARY POWER SHALL NOT ERASE THE INSTRUCTIONS STORED IN MEMORY. FULL FLEXIBILITY FOR SELECTIVE INPUT/OUTPUT CONTROL FUNCTIONS BASED ON ANDING, ORING, NOTING, TIMING AND SPECIAL CODED OPERATIONS SHALL ALSO BE INCORPORATED IN THE RESIDENT SOFTWARE
- (7) THE SYSTEM SHALL HAVE THE CAPABILITY OF RECALLING ALARMS AND TROUBLE CONDITIONS IN CHRONOLOGICAL ORDER FOR THE PURPOSE OF
- RECREATING AN EVENT HISTORY. (8) WHEN THE SYSTEM IS OPERATING ON BATTERY POWER, A TROUBLE CONDITION SHALL BE GENERATED AFTER POWER OUTAGE EXCEEDS 15 SECONDS. WHEN
- SHALL OPERATE AT THE FIRE ALARM PANEL AND ALSO AT THE REMOTE ANNUNCIATOR. ANY INITIATING CIRCUIT SHALL NOT PREVENT THE SUBSEQUENT ALARM OPERATION OF ANY OTHER INITIATION CIRCUIT.
- (11) AUXILIARY MANUAL CONTROLS SHALL BE SUPERVISED SO THAT AN "OFF NORMAL" POSITION OF ANY SWITCH SHALL CAUSE A SYSTEM TROUBLE. (12) EACH INDEPENDENTLY SUPERVISED CIRCUIT SHALL INCLUDE A DISCRETE LCD READOUT TO INDICATE DISARRANGEMENT CONDITION PER CIRCUIT. (13) THE SYSTEM BATTERIES SHALL BE SUPERVISED SO THAT A LOW BATTERY CONDITION OR DISCONNECTION OF THE BATTERY SHALL BE AUDIBLY AND VISUALLY INDICATED AT THE CONTROL PANEL AND THE REMOTE ANNUNCIATOR.
- (15) THE SYSTEM SHALL HAVE PROVISIONS FOR DISABLING AND ENABLING ALL CIRCUITS INDIVIDUALLY FOR MAINTENANCE OR TESTING PURPOSES.
- (B) SHOULD AN ALARM CONDITION CONTINUE TO EXIST, THE SYSTEM WILL REMAIN IN AN ABNORMAL STATE. SYSTEM CONTROL RELAYS SHALL NOT RESET. THE PANEL PRIORITY ALARM LED SHALL REMAIN ON. THESE POINTS WILL NOT REQUIRE ACKNOWLEDGMENT IF THEY WERE PREVIOUSLY

(A) THE "SYSTEM RESET" BUTTON SHALL BE USED TO RETURN THE SYSTEM TO ITS NORMAL STATE AFTER AN ALARM CONDITION HAS BEEN REMEDIED.

- I. ADDRESSABLE SMOKE DETECTORS SHALL HAVE AN ANALOG ADDRESSABLE BASE WITH LED INDICATOR AND PHOTOELECTRIC HEAD. SIMPLEX #4098 SERIES, NOTIFIER #FSP-851/B210LP, EST #SIGA-PS, SIEMENS #FDO SERIES. J. AUDIO/VISUAL DEVICES SHALL BE 24VDC HORN, AND XENON STROBE WITH CLEAR LENS AND RED "FIRE" LETTERING, 2-WIRE DEVICE, AND SURFACE MOUNTING
- K. VISUAL ONLY DEVICES SHALL BE 24VDC XENON STROBE WITH CLEAR LENS AND RED "FIRE" LETTERING, 2-WIRE DEVICE, AND SURFACE MOUNTING WHERE REQUIRED. SIMPLEX #4906 SERIES, NOTIFIER #SW, EST #GENESIS SERIES, SIEMENS #ZR-MC-R. PROVIDE SURFACE BACK BOX AND MOUNTING PLATE PER MANUFACTURER WHERE REQUIRED L. ADDRESSABLE CONTROL MODULES SHALL CONTAIN TWO FORM C CONTACTS, RATED AT 2 AMPS, 120 VOLT. SIMPLEX #4090-9002, NOTIFIER #FRM-1, EST
- M. INSTALLATION (1) THE CONTRACTOR IS RESPONSIBLE FOR ASSURING THAT CONDUIT SIZE AND WIRE QUANTITY SIZE AND TYPE IS SUITABLE FOR THE EQUIPMENT SUPPLIED EQUIPMENT INSTALLATION AND WIRING SHALL BE AS DESCRIBED ABOVE, AS SHOWN ON THE DRAWINGS, AND IN ACCORDANCE WITH DETAILED
- (2) JUNCTION BOXES SHALL BE PRE-PAINTED RED, SPRAY PAINTED RED, OR IDENTIFIED WITH RED COLORED STICK-ON LABELS.
- OF ASSOCIATED FUNCTION
- MEGAOHMS OR GREATER.

SUPERVISE FINAL CONNECTIONS OF THE WIRING AT THE CONTROL EQUIPMENT.

- (2) UPON COMPLETION, THE CONTRACTOR SHALL CONDUCT A TOTAL SYSTEM TEST FOR THE OWNER. AT MINIMUM, THIS TEST SHALL INCLUDE: (B) VERIFYING LINE SUPERVISION OF EACH INITIATING CIRCUIT
- (C) VERIFYING ALL CONTROL PANEL FUNCTIONS (D) VERIFYING COMPLETE SYSTEM OPERATION OWNER INDICATING THAT THE SYSTEM FUNCTIONS AND CONFORMS TO PRESCRIBED STANDARDS.
- (4) AS-BUILT DRAWINGS SHALL INCLUDE (A) ADDRESSABLE DEVICE ADDRESSES
- A. IT IS THE PURPOSE OF THESE SPECIFICATIONS TO ASSURE THAT ALL TESTED ELECTRICAL EQUIPMENT, BOTH CONTRACTOR AND OWNER SUPPLIED, IS OPERATIONAL AND WITHIN INDUSTRY AND MANUFACTURERS TOLERANCES AND IS INSTALLED IN ACCORDANCE WITH DESIGN SPECIFICATIONS.
- (1) THE ELECTRICAL CONTRACTOR SHALL COORDINATE AND SCHEDULE ALL WORK TO BE PERFORMED BY THE TESTING SUB-CONTRACTOR. (2) THE ELECTRICAL CONTRACTOR SHALL SUPPLY TO THE TESTING ORGANIZATION COMPLETE SETS OF APPROVED SHOP DRAWINGS, COORDINATION STUDY. SETTINGS OF ALL ADJUSTABLE DEVICES, AND OTHER INFORMATION NECESSARY FOR AN ACCURATE INSPECTION AND EVALUATION OF THE SYSTEM PRIOR TO THE PERFORMANCE OF ANY TESTS.
- D. CODES AND STANDARDS
- (4) ALL TESTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL ELECTRICAL TESTING ASSOCIATION'S (NETA) ACCEPTANCE TESTING SPECIFICATION FOR ELECTRICAL POWER DISTRIBUTION EQUIPMENT AND SYSTEMS. (1) THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A QUALIFIED INDEPENDENT TESTING ORGANIZATION TO PROVIDE FINAL INSPECTION, TESTING, CALIBRATION, AND ADJUSTING ON THE ELECTRICAL DISTRIBUTION SYSTEM AS DEFINED IN THIS SPECIFICATION.
- OTHER TESTING AGENCY APPROVED BY THE ENGINEER. (1) THE ELECTRICAL CONTRACTOR AND TESTING SUB-CONTRACTOR SHALL SUBMIT FOR APPROVAL AN ACCEPTANCE TEST PROCEDURE FOR EACH ITEM OF ELECTRICAL DISTRIBUTION EQUIPMENT TO BE TESTED ON THIS PROJECT. TEST PROCEDURES SHALL INCLUDE THE PROPOSED SYSTEM FUNCTION TEST. NO
- (1) AN ON-SITE VISUAL INSPECTION OF THE INSTALLED EQUIPMENT SHALL BE PERFORMED BY THE TESTING SUB-CONTRACTOR TO VERIFY THAT THE DISTRIBUTION EQUIPMENT INSTALLED AND TO BE TESTED IS THE EQUIPMENT DENOTED ON THE APPROVED SHOP DRAWINGS. THE INSPECTION SHhoCHECK THE EQUIPMENT DESIGNATIONS, DEVICE CHARACTERISTICS, SPECIAL INSTALLATION REQUIREMENTS, APPLICABLE CODES, AND STANDARDS.
- (1) SWITCHBOARDS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.1 OF NETA ATS. (2) DRY-TYPE TRANSFORMERS, 600 VOLTS AND BELOW: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.2.1.1 OF NETA ATS.
- IN SECTION 7.6.1.1 OF NETA ATS. (B) LOW VOLTAGE, POWER OPERATED BREAKERS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.6.1.2 OF NETA ATS. (C) MEDIUM VOLTAGE, AIR BREAKERS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.6.1.3 OF NETA ATS.
- (D) MEDIUM VOLTAGE, VACUUM BREAKERS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.6.3 OF NETA ATS. (E) MEDIUM VOLTAGE, SF6 INSULATED BREAKERS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.6.4 OF NETA ATS. (6) PROTECTIVE RELAYS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.9 OF NETA ATS
- (9) MOTOR CONTROL EQUIPMENT, LOW VOLTAGE: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.16.1.1 AND 7.16.2.1 OF NETA (10) SYSTEM FUNCTION TESTS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 8 OF NETA ATS.
- (B) MEDIUM/HIGH VOLTAGE CABLES: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.3.3 OF NETA ATS. (12) GROUNDING SYSTEMS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.13 OF NETA ATS. (13) GROUND FAULT PROTECTION SYSTEMS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.14 OF NETA ATS.
- (1) THREE BOUND COPIES OF THE CERTIFIED TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER AT THE COMPLETION OF THE PROJECT. (2) THE FINAL REPORT SHALL BE SIGNED AND SHALL INCLUDE THE FOLLOWING INFORMATION:
 - (B) DESCRIPTION OF EQUIPMENT TESTED (C) VISUAL INSPECTION REPORT
 - (D) DESCRIPTION OF TESTS

(A) SUMMARY OF THE PROJECT

- (F) CONCLUSIONS AND RECOMMENDATIONS

- (8) FIRE ALARM EQUIPMENT SUPPLIER SHALL SUBMIT APPROVED SHOP DRAWINGS TO BUILDING DEPARTMENT FOR PLAN REVIEW AND PERMITTING.
- (3) COMPLETE DOCUMENTATION OF THE SYSTEM PROGRAMMING SHALL BE FURNISHED TO THE OWNER PRIOR TO FINAL ACCEPTANCE.
- H. SYSTEM OPERATION
- (C) ALERT THE OWNER SELECTED CENTRAL STATION OR LOCAL FIRE DEPARTMENT SERVICE UTILIZING HARDWARE IN THE CONTROL PANEL.
- ALL ELEVATOR EOUIPMEN (4) UPON ACTUATION OF VALVE SUPERVISORY SWITCH THE FOLLOWING DESCRIBED EVENTS SHALL OCCUR:
- (A) ILLUMINATE THE APPROPRIATE ZONE LED TO INDICATE THE TROUBLE CONDITION ON THE CPU. (B) THE CPU SHALL SOUND AND DISPLAY THE TROUBLE CONDITION. (5) THE AUDIO DEVICES SHALL BE SILENCED BY THE ALARM SILENCE SWITCH. THE VISUAL DEVICE SHALL CONTINUE TO STROBE UNTIL THE SYSTEM IS RESET.
- PROGRAMMING OF THE SYSTEM.
- AC POWER IS RESTORED, THE SYSTEM SHALL REVERT TO THE 120 VAC, 60 HZ SUPPLY WITHOUT ANY MANUAL RESTART PROCEDURES. (9) THE SYSTEM SHALL DETECT FAULTS IN THE WIRING AND POWER LOSS. UPON DETECTION OF THESE CONDITIONS, A LOCAL ALARM AND INDICATION LIGHT (10) THE SYSTEM SHALL CONTAIN INDEPENDENTLY SUPERVISED INITIATION CIRCUITS AND INDIVIDUALLY ADDRESSABLE DEVICES. THE ALARM ACTIVATION OF
- (14) ALL SYSTEM CONTROL AND MONITOR MODULES SHALL BE ELECTRICALLY SUPERVISED FOR MODULE PLACEMENT. SHOULD A MODULE BECOME DISCONNECTED THE SYSTEM TROUBLE INDICATOR SHALL ILLUMINATE AND THE AUDIBLE TROUBLE SIGNAL MUST SOUND
- PRINTED MESSAGES SHALL PROVIDE OPERATOR ASSURANCE OF THE SEQUENTIAL STEPS (I.E.: "IN PROGRESS", "RESET COMPLETED", AND "SYSTEM NORMAL") AS THEY OCCUR. SHOULD ALL ALARM CONDITIONS BE CLEARED.
- WHERE REQUIRED. SIMPLEX #4906 SERIES, NOTIFIER #P2W/P2WH, EST #GENESIS SERIES, SIEMENS #ZH-MC-R. PROVIDE SURFACE BACK BOX AND MOUNTING PLATE PER MANUFACTURER WHERE REQUIRED
- #SIGA-CR SERIES, SIEMENS #HTRI-R. INFORMATION FURNISHED BY THE EQUIPMENT MANUFACTURER. THE MANUFACTURER SHALL MAINTAIN A FULL-TIME SERVICE ORGANIZATION AND SHALL
- (3) WIRING SHALL BE COLOR-CODED THROUGHOUT AND TEST FREE AND CLEAR OF OPENS, GROUNDS, AND CROSSES BETWEEN CONDUCTORS. COLOR CODING SHALL BE AS DIRECTED BY THE FIRE ALARM SUPPLIER. (4) FIRE ALARM DEVICES SHALL BE LABELED WITH ASSOCIATED ADDRESSABLE ADDRESS. MONITOR AND CONTROL RELAYS SHALL ALSO HAVE A DESCRIPTION
- (1) WIRING SHALL BE CHECKED AND TESTED BY THE CONTRACTOR IN ACCORDANCE WITH INSTRUCTIONS PROVIDED BY THE MANUFACTURER TO INSURE THAT THE SYSTEM IS FREE OF GROUNDS, SHORTS, OPENS, AND THAT THE INSULATION RESISTANCE BETWEEN CURRENT CARRYING CONDUCTORS IS 10
- (3) A FACTORY-TRAINED TECHNICIAN SHALL PERFORM ALL NECESSARY TESTS AND ADJUSTMENTS, AND SHALL THEN FILE A LETTER OF CERTIFICATION WITH THE
- (B) OPERATIONAL SYSTEM MATRIX IDENTIFYING EXISTING INITIATION, NOTIFICATION, ALARM, TROUBLE, HVAC SHUTDOWN, SMOKE EVACUATION, ELEVATOR CAPTURE, AND CENTRAL STATION OUTPUT PROGRAMMING. 29. ACCEPTANCE TESTING
- B. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE EXECUTION, COORDINATION, AND SUPERVISION OF ALL TESTING WORK REQUIRED BY THESE SPECIFICATIONS AND THE AUTHORITIES HAVING JURISDICTION. C. TESTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING AGENCY AS A SUB-CONTRACTOR TO THE ELECTRICAL CONTRACTOR
- (1) INTERNATIONAL ELECTRICAL TESTING ASSOCIATION ACCEPTANCE TESTING SPECIFICATIONS FOR ELECTRICAL POWER DISTRIBUTION EQUIPMENT AND (2) ALL INSPECTIONS AND TESTS SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE CODES AND STANDARDS INCLUDING NEC, ANSI, IEEE, NFPA, NEMA, (3) EQUIPMENT CALIBRATION PROGRAM SHALL CONFORM WITH THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST).
- (2) THE INDEPENDENT TESTING ORGANIZATION SHALL HAVE BEEN ENGAGED IN FULL PRACTICE FOR A MINIMUM OF FIVE YEARS. THE ORGANIZATION SHALL BE CORPORATELY AND FINANCIALLY INDEPENDENT OF THE SUPPLIER, PRODUCER, OR INSTALLER OF THE EQUIPMENT TO BE TESTED. (3) ELECTRICAL TESTING SHALL BE PERFORMED BY ELECTRICAL TESTING SERVICES (440-327-0078), GREAT LAKES TESTING (440-951-5890), HIGH VOLTAGE MAINTENANCE CORPORATION (440-951-8326), ELECTRIC POWER SYSTEMS (330-460-3706), INDEPENDENT TESTING AND MAINTENANCE (330-753-1422), OR
- TESTING SHALL BE PERFORMED UNTIL THE TEST PROCEDURES HAVE BEEN APPROVED BY THE ELECTRICAL ENGINEER. (2) WHERE COORDINATION STUDY SETTINGS ARE IMPLEMENTED, PICTURES SHALL BE SUBMITTED TO THE ELECTRICAL ENGINEER FOR VERIFICATION. PHOTOS SHALL CLEARLY IDENTIFY THE DEVICE. LOCATION, AND AS-LEFT SETTINGS. FOR DEVICES THAT CONTAIN COMPLICATED PROGRAMMABLE LOGIC, A SETTINGS FILE SHALL BE SUBMITTED IN THE DEFAULT FORMAT TOGETHER WITH AN EXPORT OF THE ASSOCIATED SETTINGS IN ADOBE ACROBAT (PDF) FORMAT.
 - (2) AFTER COMPLETION OF THE VISUAL INSPECTION, A LETTER SHALL BE FILED TO THE ARCHITECT STATING ANY DISCREPANCIES THAT WERE FOUND. H. ACCEPTANCE TESTING GUIDELINES
 - (A) MEDIUM VOLTAGE AIR SWITCHES: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.5.1.2 OF NETA ATS. (A) LOW VOLTAGE, INSULATED CASE/MOLDED CASE BREAKERS, 100 AMP TRIP AND LARGER: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED
- (7) INSTRUMENT TRANSFORMERS: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.10 OF NETA ATS.
- (A) LOW VOLTAGE FEEDERS #2 AND LARGER, 600 VOLTS AND BELOW: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.3.2 OF
- (14) MOTORS 10 HP AND LARGER: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.15.1.1 OF NETA ATS.

 - (E) TEST RESULTS
 - (G) APPENDIX INCLUDING APPROPRIATE TEST FORMS (H) IDENTIFICATION OF TEST EQUIPMENT USED

(8) METERING: PERFORM ALL TESTS, INCLUDING ALL OPTIONAL TESTS, LISTED IN SECTION 7.11 OF NETA ATS.

JONATHAN J NUMBER E-20230001

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As Noted on Plans Review



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